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EUDOSIA:

OR,

A POEM

ON THE

UNIVERSE.



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MDCCLXXXI.

32

TO
THE PERSON
TO WHOM HE OWES
THE GREATEST OF POSSIBLE
OBLIGATIONS,
THIS POEM
IS AFFECTIONATELY INSCRIBED,
BY THE AUTHOR,
CAPEL LOFFT.

—Quodcunque mea poterunt audere Camana
Seu tibi par poterunt—nam spes neque cogitat ultra—
Sive minus—certeque canent minus—omne volumus
Hoc tibi; ne aulei careat mea nomine charta.

TIBULLUS.

O H! NATURE all sufficient! over all!
Inrich me with the knowledge of thy works!
Snatch me to Heaven. Thy rolling wonders there,
World beyond world, in infinite extent
Shew me: their motions, periods, and their laws
Give me to scan: through the disclosing deep
Light my blind way; the mineral strata there;
Thrust, blooming, thence the vegetable world;
O'er that the rising system, more complex,
Of animals; and higher still the mind,
The varied scene of quick compounded thought,
And where the mixing passions endless shift.
These ever open to my ravish'd eye,
A search the flight of time can ne'er exhaust,

And whisper to my dreams. From THEE begin,
Dwell all on THEE, with THEE conclude my song;
And let me neyer, never stray from THEE!

THOMSON'S AUTUMN.

E U D O S I A.

B O O K I.

THE EARTH.

THE various members of the *World*, the tie
Which knits discordant principles of things,
What movement rules the Seasons, changes heat
To cold, obscures the sun and silver moon,
Of the fixt stars the splendid magnitude,
And by what law the planets wind their maze,
My mind desires to teach——

Thou who dost live
Supreme in unapproach'd eternal light,
O holy Father of the UNIVERSE! 10
Prosper my bold design, while thy great works
Far o'er the nations we rehearse, and shew
The immense design to their astonish'd eyes,
The glories of the heavens: if so the race
Of truth unknowing may uplift their mind,
Sunk in the lap of listless indolence
Too long; and gazing on the flaming walls,
“Mound within mound,” of the wide system, learn
To own the Maker, by whose power is held
So great a mass; by whose unchanging laws 20
Govern'd; and who, to use beyond compare,
Gracious and wise, conforms the glorious work.

A

And

And thou, EUDOSIA, my life's better part,
 The bright inspirer of my youthful thoughts,
 Whose eyes and whose example, heavenly fair,
 With added lustre from that angel form,
 Rais'd whither schools but slow and weak aspire,
 In quest of all-divine philosophy.
 Come, with that radiance softly beaming, come —
 The elevated mildness of those looks, 30
 The winning harmony of that dear voice;
 Come, animate, assist, correct my song:
 For beauty dwells not languidly in thee,
 Disjoin'd by severance unnatural,
 From wisdom and from goodness; whom the Sire,
 Perfect with her, o'er his creation sent.
 And nor regardless thou, nor ignorant
 Of those great splendid wonders all around,
 In the pure æther: though thy modesty,
 And the soft graces of thy gentle sex, 40
 With apt concealment elegantly veil
 Those higher powers, and bid them mildly shine.

Whate'er we see, around, beneath, above,
 Through the great series of still flowing years,
 Which comprehends all of created things,
 Antiquity the UNIVERSE hath nam'd.

And though the SYSTEM in connexion just
 Be ONE in temper'd harmony of parts,
 And keeps the order given by the ONE,
 Who made and rules it; yet not every part 50

Is of one genius, energy, or rank.
 Nor are the starry orbs, although sublime,
 The palaces of Heaven, to our weak sight,
 Yet from decay exempt: nor dare to boast
 A constant tenor of immortal youth.
 But, whatsoever Nature comprehends
 In her great bosom, which embraces all
 Created being, feels vicissitude:
 Most sensibly our earth in tumult tost
 Labours; yet to no part is rest intire.
 Each rushes on itself, by civil wound,
 Destroying or destroy'd; and springs anew
 To untried functions in another sphere,
 To die again. Witness the *Elements*,
 Earth, and the thinner Waters, and the Air,
 Higher than these, and Fire that soars above.

—But when four Bodies I enumerate,
 As Elements of all, be it not thought
 This orb of earth consists of Principles,
 So many independent and distinct;
 Or that the native form, which Matter bears,
 Is thus divided in the scale of truth.
 Perhaps one simple form of Matter*, first
 Obedient to the high creating will,
 Forms Earth and Water, and the Flame and Air,
 In mystic fables Proteus rightly nam'd
 Too subtle for the sense; apt to assume

* V. note.

All forms, and active equally to change.
 For Water into Earth transforms, and Earth
 Vanishes into Water; into Fire 80
 The watery substance mounts insensibly,
 Steaming; and Air from all of these results:
 Itself returns in mist and showers; and thus,
 Each in its turn, revolving into each,
 This mighty World is Metamorphose all.
 But, whatsoever name you give, how'er
 Divide material Principles, be this
 Retain'd; that Matter, such as we behold
 In the vast System, owes its energy
 To the controul of the Almighty Power *, 90
 Inert itself, to motion or to rest
 Indifferent; extended, solid, void
 Of counsel or design, or will innate.
 Nor does it seem consistent to allow
 Lightness amidst the class of Properties,
 Which Matter owns; except as relative.
 For in a rarer medium, what we now
 Call light will sink; as Cork in Water floats,
 And bears great masses of superior weight,
 But falls in Air: nor Mercury supports 100
 Gold, though immers'd in this Iron will sink.
 And even Gold dissolv'd swims; and, when beat
 Into thin leaves, sports in the viewless Air.
 Nor even Iron in the stream will sink,
 Or Cork upon its liquid surface float,

* V. note.

If from the Water artfully you take
Its upward pressure; or as much as yields
Water to Iron's weight in equal bulk,
So much of Water gently pour above.
But this more largely in our future strain. 116

Nor of resisting matter, when we speak,
Is meant resistance of its native force,
But merely as if solid and inert.

Nor when of force *centripetal* we speak,
A choice is meant, or active will possess'd,
By matter to a sole ideal point.
Not so ill-tutor'd our philosophy;
But that the parts of body, severally
Each to its centre, and each greater mass
To centre of the Common System tend: 120
This, if not Reason, let Experience teach.
Nor mean we here to signify the Cause;
But fairly and distinctly speak the Fact.

And thus, whatever bodies you behold
Within our System, or their rarer make
Or density, assigns to proper place;
Since the more dense concrete into a mass,
And, gravitating, form this solid globe;
Which the soft pliant waters circle round,
Moistening our earth, and cheer its thirsty plains: 130
Above, the rarer atmosphere expands.
These three, Earth, Water, and the active Air,

So well connected with each other link,
 That the exterior orb, with close embrace,
 Folds the interior: thus the liquid wave
 Would cover earth intire, did not the form
 Globose prevent; which care divine hath rais'd,
 Bounding the sea's wild tumult with the sand,
 And to the Heavens disclos'd this honour'd globe:
 From whence the habitant of earth, heaven-born, 140
 Might look to the bright walls, flaming on high,
 Of that his destin'd country; and, though press'd
 In darkness and disease, in doubt and care,
 Soar with aspiring hopes above the skies.

Therefore the Elements observe their bounds;
 But Earth and Water in one body join,
 Within one frame of mutual union orb'd;
 Yet separate and free; both bent alike
 By Gravitation to a spheric form,
 Which all, that to a centre tends, affects. 150

Thus reason teaches Earth to be a Globe;
 But, if the sense appear a safer guide,
 Signs are not wanting to evince the truth:
 For, if the face of earth were wholly plain,
 The sun not sooner would salute the East,
 Than Cadiz would be brighten'd by his ray:
 And, at his setting, night would shroud at once,
 With her black wings, all nations of the globe,
 On the one surface of that mighty plane,
 Now by degrees Aurora breaks the shades; 160
 And,

And, when the golden lamp wakes from his couch
 The soft inhabitant of Ind, night's dew
 Rises in West; when she involves in gloom
 The Indian regions, splendid radiance spreads
 On the fair brow of the Hesperian land;
 Slower to these, and earlier to those,
 Since Earth, with curve insensible, ascends,
 Presenting the successive beams of day:
 Nor less the eclipses of the moon will prove;
 When, to her brother's rays oppos'd, she veils 170
 Her countenance in melancholy dusk:
 For when with us in early night obscur'd,
 At midnight Persia views her darken'd orb.

Why if the Earth were plane, when the eclipse
 Is partial, is the line of darkness curv'd?
 For still the shadow gives intelligence
 Of that from whence it flows; triangular,
 150 When from a triangle it comes; and square,
 Or an oblong rectangle, when it strikes
 Projected from a square: the globular 180
 Casts a round shadow ever; but the plane,
 If circular, oft strikes into ellipse.
 Therefore, since still the shadow, which is cast
 From the Earth's body on the moon, is round,
 Conclude the Earth a Globe; and see the truth.

And hence too, that the earth's declivity
 On either side presents a Sphere, we learn:
 For, as we journey farther to the South,

The

The Cynosyre sinks nearer the North Pole.
If northward more, then the resplendent Wain 190
Rises: and thus the correspondent Heaven
Answers our progress on the convex earth.

Nor let it move thee, that some parts rise high
In mountains; others sink into deep vales;
Each way conformable to human use.
These inequalities to us seem great;
But to an eye that comprehends the whole,
The tumour, which to us so monstrous seems,
Is as a grain of sparkling sand, that clings
To the smooth surface of a sphere of Glass; 200
Or as a fly upon the convex dome
Of a sublime, stupendous edifice.

Nor less the Wave to the same form aspires,
Press'd by its weight and gravitating force:
For as on land, so in the vast of sea,
The Pole now rises, and now sinks, depress'd;
While ocean swells a portion of our Sphere.
Behold, when the glad ship shoots from the port
Upon full sail, the hulk first disappears,
And then the lower, then the higher sails; 210
At length the summit of the towering mast
Alone is seen: nor less, when from the ship
The longing sailors eye in hope the shore:
For then, from the top-mast, though more remote
Than either deck, the shore is first beheld.

Nay,

Nay, in the smallest drop this truth is seen;
Which, still consenting with the greater mass,
Assumes the honours of a spheric form,
And constantly its rights, as Water, keeps:
So the poor spark in ashes scarce discern'd. 220
Not less is Fire, than that which to the dust
Level'd the towers of proud Laomedon;
Nor more the properties of fluid claims
The immense of ocean, than the dew which rests
In liquid pearl upon the summer's blade;
And as this dew coils in a silver orb,
And as the drop dependent from each roof,
When the autumnal heaven descends in rain,
The same just figure constantly affects:
So the diffusive fluid of the sea 230
Swells convex, and preserves an equal form.

But wherefore reasons from analogy,
Wherefore by intermediate proofs the truth
Which now more clear shines forth, and more direct;
Since nor the vapour, which obscures the Ind,
Checks avarice; nor that which burns the plains
Of Æthiopia; nor the polar frost.
Now the impatient vessel hath unlock'd
On all sides the recesses of the world,
And secrets, to long ages past unknown, 240
Are now reveal'd; since from the Stygian gloom
The fire of vengeance sent forth Avarice,
The sister of the harpies; her pale face
Rude, unadorn'd; ghastly her countenance;

B

Her

Her forehead wrinkled, with incessant cares
Emaciate; her unhappy limbs denied
Or rest or food, though both invite her choice;
And loathsome venom dwells upon her tongue,
Still exercis'd in fraud and perjuries;
And dreams of anguish harrow her tir'd soul. 250
She formerly wing'd the Phœnician fleet,
Urging rich Tyre; and thee, proud Carthage, drove
To ruin, through the clashing gulf of gain,
With Syrens, rocks, and whirlpools all beset:
Under her guidance the Sidonian keel
Tempted the wave, and wealthy Egypt sought
Yet untried luxuries on other coasts.
She, with ambition leagu'd—dreadful to think!—
Sent forth great Cæsar from imperial Rome
To seek this isle of ours: witness, thou Thames! 260
And ye, my country's meads, that little know
The tread of hostile foot! Ye long sustain'd
The arms of Julius; ye with generous scorn
Shall see invasion, trembling, eye your coasts;
If ye will cherish simple industry,
Plain open worth, the independent soul,
The solid virtues of your ancestors.
For this each art of genuine excellence
Grows, flourishes with you: for this, we turn
Your eyes to gaze the stars, and read the Heavens.
But Avarice was ill content to grasp 270
Thy treasures, China: and whate'er the East
Of spacious provinces and boundless wealth
Encircles, she hath ransack'd; far she spread

Her

Her devastation e'er the needle taught
 Safely to quit the coast, and range the deep.
 What hath not limitless desire of gain
 Presum'd? What deeds hath Avarice not inspir'd?
 She erst malignant stalk'd the scanty shore
 Of Portugal, and in the active race
 Infus'd her spirit: in their view she sets
 Long unrewarded labour; ceaseless toil
 With an ungrateful clime; spare diet, life
 Comfortless, spent beneath a peasant-roof;
 And, midst delusive shades in the still night,
 Sports with their credulous minds in thousand shapes;
 Shews them the spicy grove, the inviting fleece;
 And here woods bending with the silky load,
 There cinnamon, and frankincense, and myrrh;
 And there, upon the fields unknown to toil,
 The busy ant collecting gold for grain.
 Illuded thus, and urg'd by poverty
 And hope of great reward, their house, their wives,
 Their native land they leave, and aged fires,
 And children plaining in life's helpless verge;
 And reckless set their souls upon the die,
 Their leader Avarice: and though one rage
 Impels them all, yet fear awhile constrain'd,
 To doubt the unknown ocean, wind the coast,
 And trust with sparing confidence the waves;
 But when with gain unbounded boldness grew,
 Forth to the deep they rush, their dear, dear home,
 Far left behind; and plough the shoreless Sea,
 The spoils of Æthiopia, Guinea's coasts,

And Congo, parch'd beneath too fierce a sun,
Their treasures boast no more; nor all the wealth,
Accumulated stores from age to age,
Which Afric holds; or all it once despis'd,
E'er with our lust of gain contaminate.
India alone impels the enraptur'd mind, 310
India alone seems fated to appease
The ever-growing appetite for gold:
Where the ecliptic cuts the burning line,
Thither, and far beyond, the insatiate thirst
Of lucre penetrates: nor silken spoils;
Nor cultivated China's peaceful gifts;
Nor whatsoe'er, to the extreme of East,
Bounded the car of Bacchus; nor the climes
Where Hercules o'ertook the western sun;
Nor all that the Pellean conqueror 320
Vanquished, suffices Avarice: where'er,
Or to the fiery Crab, the earth inclines;
Or to the wintry realms of Capricorn;
Beyond both tropics her rapacious wing
Hovers incessant to pursue her prey;
Invades the North, and tempts the Southern pole;
Regions which ignorance has doom'd to night,
Or letter'd Science fears to think exist;
These she has found, or hopes: where never flew
The Roman eagle, or the untam'd force 330
Of Scythian vultures; never Glory led,
Nor wandering Famine; nor the Poet's eye,
In his wide scope of visionary glance,
Rang'd: even there the wicked love of gain

Hath

Hath broke its way, and seeks a farther track,
Through ways untried, to worlds yet unexplor'd.

And yet not all we blame. Breasts there have been,
Whom thirst of knowledge, and the vivid ray
Of virtue, and the emulous desire
To serve their country, and to bless mankind, 340
Have urg'd to combat against every ill.

Ye should I blame?—the glorious stars of Heaven
Would not permit: earth would herself exclaim,
If I should dare to violate your shades.

Illustrious minds! O great COLUMBUS*, whom,
Whom should it not delight to think on thee!

Thee every age shall celebrate, sublime
In nature's study; pious, brave, and mild;
And wise and eloquent: thee shall the world
Admire, of act intrepid; in the extreme 350

Of adverse fortune patient; firm to bear
Prosperity, and stem her proudest tide,
With equal temper. Though a different cause

Impel the greater portion of mankind,
Yet powerfully it urges: thirst of gold,
And lust of sway, and fiercer than these fiends,
Relentless Superstition; not alone

The love of Knowledge, and the towering step
Of Virtue, all divine, have led the way.

Thus hath the form of this our earthly world 360
Been learnt: nor single hath this honour crown'd
The Magellanic* mast: nor British zeal

* V. note.

Content with a fourth* voyage round the globe,
 Swift, and more swift, fulfilling each career.
 To thee, O COOKE*, familiar grew the task
 Of circling all our globe: Ocean rever'd
 Thy hardy enterprize; reveal'd to thee
 New awful secrets of his mighty world;
 His waves, his rocks, his unrelenting storms
 Are guiltless of thy death. The sailor bless'd 370
 Thy wife, parental care; Philosophy
 Records with pride thy life-preserving arts:
 And oft by the ill-fated strand, where thou
 O'erpower'd by barbarous multitudes art fallen,
 The passing ship shall veil her gallant pomp
 In homage to thy memory, which lives
 With the great names of ANSON* and of DRAKE*.
 Thus nought hath been untried that Art, or Toil,
 Or Resolution might effect; and now,
 Rich with the long accumulated spoils, 380
 Knowledge of distant ages and its own,
 Of rapid growth and of immense extent,
 GEOGRAPHY triumphant reigns; and shews
 The Earth, and sea, and air one perfect orb,
 Self-balanced in the viewless realm of space.
 Of these less liable to sudden change
 The solid Earth; while the impatient wave
 Suffers dire agitation, and the air
 Incessant fluctuates: for, when the Sun
 Darts from his Eastern throne the potent ray, 390
 And drinks the sparkling dew, then steam from earth

* V. note.

The excited vapours : the horizon dim
Sends forth the host of clouds : gathering they spread
In gloomy majesty, and veil the Heavens ;
Soft fall the balmy Showers ; or battering Hail
Pours on the plain his desolating war ;
Or fleecy Snow covers the deepening vale,
And cloaths the hills ; or hoary Frost illumines
The glistening copse ; or, weigh'd beneath the load
Of ice, the forest trembles ; or the wrath 400
Of Boreas, rushing from his Northern cave,
Hurries the broken clouds, and terrible
Rides in the whirlwind thro' the affrighted sky.
Meanwhile, by the Benignity supreme,
And perfect wisdom of Omnipotence,
The earth but rarely feels a sudden shock:
And seemingly in total rest abides :
Yet, constant is her motion ; regular,
And equable, and beautifully just :
Daily her axe revolving ; in her orb 410
Elliptical, completing still the year :
Yet, what opposes our hypothesis,
Let us awhile attend. The Gravity
Of this terrestrial mass is urg'd in proof
Of endless rest and immobility ;
But if a greater gravitating mass
Compels the Earth's obedience—such the Sun,
Hereafter in his central throne, we view—
What shall forbid her to revolve? And this,
The fair Analogy suggests, beheld 420
Through all the planetary choir ; the theme
Of

Of our succeeding lays—and scarcely now
 Will childhood hear the objection, once of weight,
 When dawning science faintly pierc'd the gloom
 Of tenfold night, to raise perplexity
 In learned and in philosophic breasts.
 No more we ask, why they, if Heaven is fix'd,
 And earth in motion, still our eyes deceive,
 And shew us the revolving sun and stars.

Ask not the voyager to disbelieve 430

The motion of his vessel o'er the sea,
 Because he feels it not, and sees the port
 Fleeting from view; while in successive course
 The shore retires, and to his eager eye
 New shores, new harbours rise: the traveller,
 When he beholds the woods, the cities move,
 Ne'er thinks it real motion: of the eye
 We learn *Appearances*, and trust the sense
 To represent them uniformly true,

In correspondence to their latent Cause. 440

That Cause by reason and comparison
 We trace; selecting and combining facts,
 Till the apparent and the true is found;
 How far concurrent, or disjoin'd how far.
 If this were wanting, the keen eagle's eye,
 Or the fly's tender microscopic sight,
 Might long have boasted just pre-eminence
 O'er the sublime Philosophy of Man.

Suppose however, for the real truth

More full and more enlightening meets the soul, 450
 When with the semblances of truth compar'd;

Sup-

— Suppose, then, Heaven to stand, and earth revolve
In twice twelve hours her unremitting orb;
Velocity like this, nor darts can boast,
Nor arrows flying from the elastic bow,
Nor winds; nor deathful globes by rapid flame
Urg'd from the cannon. Thought-surpassing speed!
And see you not, when but an infant's toy
Spins in the air; or when the archer gives
Its liberty to the impatient shaft;
Or when, the furnace but in part disclos'd,
Rushes the fire, how much the air resounds,
And testifies against the violence
By which its thin expanse is agitated.
If then a trifling weight, a slender force,
Excite this tumult, think with what a storm
Earth, bearing all her woods and craggy rocks,
Must rend, exhaust, tempest the indignant air:
Would not, if Earth with such infuriate speed
Whirl'd to the West, and to the East revolv'd,
All snake, all be confounded? Houses, shrines,
Great cities, with their wretched habitants,
By sudden ruin all must sink oppress'd:
The very birds, who sail the yielding sky,
Would mourn their woods, their nests, and tender
young;
Their loves perhaps; snatch'd from them by the whirl
Of the impetuous earth: nor then would dare
The turtle to entrust himself alone
To the fresh breeze; lest, by the giddy flight
Of this our orb, he should be taught to feel
The long, long sorrows of a widow'd life.

C

What,

What, when the Persian cavalry pours forth
 To Turkish or Tartarian arms oppos'd;
 If the Heaven stand, and Earth volubile turn,
 As the dart wings its progress through mid air,
 One side would meet and rush upon the death,
 The other never could effect a wound:
 Vain would the weapons, by the adverse wheel
 Of Earth's swift axis, at the darter's feet
 Fall. What, if when the rolling globe revolv'd 495
 Whirls to the West, all stagnant sleeps the sea,
 Must not a mighty portion of the earth
 Float on the waters, all unus'd to bear
 The burthen of a pebble? Must it not,
 By ocean daily overwhelm'd, in turn
 Successively present a barren land
 And watry waste?—If from the Eastern port,
 Less distant than the West, the Earth knew change
 Of situation in the fields of Heaven,
 The orient sun in ampler majesty 500
 She then would view; than, while his front declin'd,
 Verges to bathe in the Hesperian wave.

— Besides, the sacred oracles of truth,
 Do not they teach the motion of the Sun,
 And the inertness of the steady Earth?
 Reason to these and Piety command
 An humble deference and prompt belief:
 For he, who built the universe, which now
 His power unlimited rules and supports,
 Best knows the fabric, best can speak its laws. 510
 With

With these objections former ages us'd
To press the system by which Earth is prov'd
To wheel her *annual* and *diurnal* orb:
But what reply to these Urania deigns,
Well knows EUDOSIA: her the sacred Muse
Of true philosophy delighted sees,
And with her walks familiar: not displeas'd
Will she revolve the arguments of truth
In strains attempt'd to her shepherd's reed.
And those, who yet hold knowledge uninform'd, 520
In mere opinion, from these lays may trace
Proofs not unworthy of the youthful ear.

First then, we speak not of the Earth compar'd
With missile weapons from an human hand;
And nigh another Earth of nitrous grain
Would be requir'd, if this our globe were urg'd
By force of such a kind, as that which darts
From the impetuous cannon: nor do we
Compare the cause impelling such a course
To the wild varying fury of the wind; 530
But by his nod who rules the Host of Heaven,
And gives to Saturn and to Jupiter—
Far greater bodies than our globe of Earth—
Their periods and rotation: gives to Mars,
To Venus, and the Moon, and all the cohort
Of planets, whom hereafter we shall bring
To the admiring eyes in order due.
Nor noise expect, nor sound: for these are born
From harsh collision of resisting force;

But in the Earth, ranging the void of space 540
 Where Matter none, or most refin'd, is spread
 In such a journey, fear not any flock :
 For Matter, still ascending *, grows more rare,
 Till from the sense and philosophic ken
 It vanish; leaving free the plains of Heaven,
 Apt for the motion of celestial spheres.

Even in denser waves a mighty ship,
 Urg'd by the sails upon the favouring sea,
 Frights not the deep with boisterous violence,
 Nor rushes with harsh murmur o'er the main, 550
 Though swifter than the racers best of speed,
 As from the bow an arrow o'er the flood,
 She flee: for, wanton to the sportive gales,
 Gliding she plays, and wins with track unheard
 The yielded current of the ocean.
 And if a vessel, built by human hand,
 Thus with a soundless course trace the dense wave,
 What think you Earth, with neither seas to stem,
 Nor lighter air (which yet the bird can sail
 With freest wing) but in the mighty void, 560
 Mov'd by the guidance of the Deity.

And then reflect with how much swifter flight
 The stars must whirl through a much ampler space;
 And Heaven's convexity roll the vast sphere,
 If Earth unmov'd remain *: nor need we dread
 Lest Earth should flee from her inhabitants,

* V. note.

More than the sailor lest the ship should run
From the full crew she bears, and leave behind
Her living burden : for the crew and ship
One general motion wafts one common way. 570
Nor therefore is the mariner restrain'd
From walking perfectly at liberty,
Or to the right on deck, or to the left ;
Backwards or forward ; to ascend the mast,
Or to explore the hold : in every case
Motion, Collision, Rest, or Change, of course
Alike prevail ; whether the place, which holds
The bodies subject to these accidents,
Move, or be still : the common vehicles
Nor prejudice the motion, or the rest, 580
Of that which they convey. To stand, to lie,
To creep, to go, to run, to fly is equal,
Whether the Earth quiescent, or the ship,
Be still for ever, or for ever speed.
The same the nature of the following wave,
Whether the Earth be mov'd, or motionless :
For if the earth move rapid, though unfelt,
Alike the ambient atmosphere proceeds
With inoffensive, still obsequiousness :
Alike the broad, vast zone of water moves ; 590
As haply shall in time more plain appear :
Yet, if the oracles of Heaven pronounce
The contrary of our hypothesis,
Our knowledge has no frenzy so absurd
To war against his truth omniscient,
Who made the Earth, the Heavens, and all their laws.
But

But not the nature of external things,
 The laws of the material Universe,
 Do we contend the Almighty meant to teach
 His people in the sacred oracles ; 600
 But left to Reason and disclosing Time :
 And what by MOSES * of the World's Beginning
 Is taught, we own obscure, and know concise ;
 Less to Philosophy than Piety
 Devoted : still the motion of the Earth
 Is not by Heaven's great oracles denied.
 Who, when he speaks of war and vanquish'd kings,
 Were it to nations most for learning fam'd,
 Would to Astronomy conform his style ;
 When to the subject popular discourse 610
 As truly, and more clearly, represents
 The idea to be given ? Shall a chief
 Excite his doubtful followers to arms,
 By telling them, go, confident in might,
 Beneath the conquering arm of Providence ;
 Nor fear the number of your enemies,
 Their force, or wiles : for GOD from Heaven gives
 A present sign ; the Earth you shall behold
 Staid in her course, and standing fixt in Heaven.
 Will not COPERNICUS, PYTHAGORAS, 620
 And NEWTON's self, when of Phænomena
 They speak, conform to the appearances,
 Not to the Fact and philosophic Cause ?
 Thus the Sun rises to Philosophers,
 Alike of PTOLOMEY or NEWTON's school ;

* V. note.

Nor Calculation disagrees in ought :
 Thus to the subject wisely they will speak,
 And thus distinctly to the popular use;
 In different style when they explain the truth,
 And when they speak of visible effects : 630
 Yet in this difference consistent still.
 When of the Sytem the great Law they teach,
 And all the lucid order, which pervades
 The works of Nature, then, and only then,
 They quit the appearance; but, when History
 Speaks to the people, shall we wrest her speech
 From pure and simple perspicuity
 To pedantry unworthy of the schools?
 Be rigid to the words, the Sun must stand
 In Gibeon, and the Moon must rest her orb, 640
 Sojourning in the Vale of Ajalon.
 Thus Reason, Scripture, and Philosophy
 Are found concordant, when the literal Sound
 Is not our idol, but the Sense rever'd.

Now let us seek the *Measure* of the Earth.
 What is the circling Line which comprehends
 Its ample sphere ; what the Diameter
 Which, through the Centre from the Surface, strikes
 Directly to the superficial point
 Oppos'd ?—and whence antient sagacity 650
 Trac'd the Dimensions of our World entire?
 Thence, rising by like effort, we explore
 The Magnitudes of various orbs remote,
 To which Earth sinks with all her pride compar'd.

The

The fathers of Chaldaean lore, who liv'd
 Inhabitants of an extended plain,
 Free to the skies, and peaceably enjoy'd
 In length of days the Providence of Heaven,
 First gave the Stars their order and their names;
 And by symbolic forms characteriz'd: 669
 For to the eye propitious, and the mind,
 Smil'd the bland æther in perpetual calm,
 And cloudless as the Throne of fabled Jove:
 Therefore, their industry by measur'd bounds
 Limited the great Circle of the Heavens,
 Number'd its Regions, and the Compass set
 On the vast Concave. In four equal parts,
 From the blithe Ram round to the frozen Fish,
 Their Circle they divided; and each *fourth*
 Ninety degrees was destin'd to contain, 670
 As from the East to West the order ran;
 And from this Circle, drawn to either pole,
 Ninety degrees alike the settled space;
 A QUADRANT named; since it includes exact
 The *fourth* of the entire Circumference.

This once perform'd, it seem'd disgrace to man,
 If, when his searching thought so far had rov'd,
 And his strict industry triumph'd so high,
 The Earth, on which he liv'd, unknown should rest,
 And he a stranger to his native glebe; 680
 Whose Eye explor'd, whose Compass mark'd the
 Heavens.

Shall he be ignorant of kindred men,

Of

Of bordering states unknowing and unknown?
But while or torpid Cold, or fiery Heat,
Or the dire Monsters of unbounded wilds,
Was held a barrier to desir'd access,
Invincible, o'er much the greatest part
Of this our Globe; and worse barbarity
O'er mighty realms inhospitably frown'd,
What to the winged vessel was denied, 690
Nor yet the venturous foot dar'd to explore,
The mind's anticipating force subdued,
And found in Heaven a measure for the Earth:
For, when the foot on the Assyrian plain
Travel'd directly North, and number'd miles,
Thirty twice told, and near a seventh beyond,
And to the Polar Star his Astrolabe
Directed, he observ'd the Pole was risen
By one degree; thence, Southward from the point
Whence he commenc'd his journey, travelling, 700
He found the Pole by one degree was sunk:
Thus long experience learnt, that seventy miles,
One half excepted, measur'd a degree
On the celestial Globe, to the convex
Of the Earth transferr'd: this number multiplied,
By the divisions which the Quadrant holds,
And that four times repeated, gives the Earth
A great *Circumference*; in ample line
Twenty-five thousand miles, if Earth possess'd
The equal figure of a perfect Globe: 710
From thence Archimedean wisdom takes
A *third*, and a small portion adds beyond,

D

And

And thus produces the *Diameter* ;
 Which, as a mile computes our distances,
 Serves to compute the distance of each sphere
 In the great system of our solar train :
 Nor mountains, nor impenetrable deeps
 Obstruct the philosophic eye ; which views
 The axis of our Globe, and meets the line ;
 Howe'er to fight inscrutable and lost.

720

Hence let us rise, and to the Heavens compare
 This Earth, the Theatre of human pride,
 Ambition's Universe ! Here History
 Expatiates ; here the Geographic Muse,
 Exulting, points to ample provinces,
 Kingdoms, and empires ; here the insatiate sword
 Gorges on hourly hecatombs of men ;
 And, for these fragments of a speck, the car
 Draws the triumphant conqueror, sublime,
 In envied state, exalted as a god :
 For this bold Commerce spreads the restless sail,
 And to new points stretches her aching eye ;
 Isles and ideal continents. O mafs,
 Great and stupendous, if the groveling soul
 Cling ant-like to the hillock ! But how small
 If to the starry Universe compar'd !
 Even a Point ; an Atom ! Multiply
 The mighty aggregate of land and sea
 Ten thousand by ten thousand times ; proceed
 Till Computation faints beneath the toil,
 And Industry herself cries out ' no more ; '

730

740

Still,

Still, to a little portion of the whole,
The amazing aggregate is like the Mite
To all the Planetary worlds: nor Toil,
Nor Penetration, with her angel ken,
Can note proportion. Were not all the orb,
Which Earth in *annual* progress comprehends,
A very nothing to the *Universe*,
Some difference distinctly might be found,
And not an equal hemisphere of Heaven, 750
Into six signs divided, still appear
O'er all the Globe: nor less two Stars oppos'd,
In Taurus this, and that in Scorpio,
Of kindred splendor and of rival state,
In their apparent magnitude, evince
This awful truth. Watch, soldier, from thy tower;
Lift up thine eye, unwearied mariner,
Wherever upon Earth, or Ocean fix'd:
When one is rising from the Eastern wave,
The other in the Western sea descends: 760
Therefore, nor mountains, nor aërial capes,
Nor Earth entire, is ought in estimate,
When balanc'd with the Heavens: greater the speck,
Which on the sun-beam dances, when compar'd
With Taurus, or the Alps, or Caucasus;
Or on the blade the dew-drop to the sea.

Behold the *Sun*! how much in magnitude
Above the Earth, hereafter we explore—
Great as he is, and to so many worlds
The source of Light, scarce does he seem to us,

Full in unclouded majesty reveal'd, 771
 Beyond the brief dimensions of a Foot.
 But, should he lift thee to his flaming Throne,
 How from that eminence would Earth appear,
 If visible; yet to the *Orb*, through which
 Obsequious Planets move beneath his reign,
 How small the *Sun*! And to the starry WHOLE
 The *Solar System* shrinks dimensionless.

This is that seat of beasts, of birds, of men,
 The Earth! * How much of this confin'd domain 780
 Surrounding Ocean covers, and the sea,
 Fretting with inroad the Herculean straits,
 The watry mound 'tween Europe and the tract
 Of Africa. Add the Arabian gulph;
 The Caspian; add the vast Hesperian lakes,
 The stretch of rivers; rushing cataracts
 From headlong heights; add subterranean springs;
 And the great main, outspread beyond the line,
 To the chill limits of the Southern Pole,
 Possessor of the *fourth* of this our Globe: 790
 While those encroach, these hold the buried world
 Beneath their floods: what yet remains of Earth?
 Say how much hide the boundless sands; how much
 Swells into hills incultivate, and rocks:
 Useful indeed, and worthy of the hand
 Of perfect Wisdom; but to no assay
 Yielding, for ever steril, and condemn'd
 To silent desolation. Look how much

* V. note.

Pestilent air infects; how much the Sun
Scorches; how much is bound in stagnant cold; 800
Desert how much, and barren; or of plagues
Fruitful; of poisonous herbs and venom'd beasts.
Yet these or care subdues, and prudent toil,
Or habit reconciles; much is by good
Compensated: mild zephyrs there, the sweets
Of rich abundance; there a length of day,
Firmness of body, and intrepid souls;
Clear and sagacious thought: here medicine,
From baneful drugs, extracting latent health,
And from the seeds of death producing life. 810
But Man, the worst of evils is to Man:
Earth in itself, however small compar'd,
Is ample for us, creatures of a day;
Poor, self-destroying, vain inhabitants!
Nor needs to bathe in blood the civil sword,
For barren triumph over slaughter'd friends,
Or useless empire in a soil remote.
O shame, O madness of all grasping man!
Look on the spot, where Glory spreads her plume,
Anger, Revenge, and Hate; Desire and Fear 820
Mingle in tempest; Treachery and Force
Conspire; and Nature in eternal war
Anticipates the universal wreck.

END OF THE FIRST BOOK.

THE HISTORY OF THE

PROGRESS OF THE

ARTS AND

MANUFACTURES

OF GREAT BRITAIN

FROM THE

EARLIEST PERIODS

TO THE PRESENT

STATE

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EUDOSIA.

BOOK II.

THE PLANETS.

NOW, my EUDOSIA, to a nobler scene.
Now, leaving mortal cares, the fields of Heaven,
Free, and sublime, and pure, as is thy mind,
We range. Nor shall the toil of DÆDALUS
Be call'd in aid; nor for our flight be us'd 5
The wings of the Triptolemean car;
Nor mountains, heap'd on mountains, scale the skies.
Lead me, O fair and wise! point to my view
The wonders of the Heavens, well known to thee;
Correct, refine, and animate my song:
While in the paths we tread, where Atlas rear'd
His head above the cloud; where Hercules
Fix'd the great pillars of eternal fame;
Where Contemplation's heavenly fire was seiz'd, 15
Illustrious theft! by bold Prometheus;
Where Cepheus, Perseus, and Andromeda,
And the fam'd shepherd of the Latmian hill,
Have planted their high name amidst the stars;
And where, unmix'd with fable, shines rever'd
Thy name, PYTHAGORAS*; and thine, O Sage,

* V. note.

Whom

Whom Prussia * still shall boast ; nor yield the palm
To Greece ; nor more admire the glory spread
By martial fame around her FREDERIC.

O Friend of letters and philosophy,
Upon whose awful brow Minerva's wreath, 25
Twin'd with the brightest crown that Mars could give,
Beams with superior radiance ! thou, well pleas'd,
Wilt bow the conqueror's laurels to the man,
Whom philosophic dignity exalts.

And O, in what a flood of glory strikes
The great NEWTONIAN * Star our ravish'd eye !
Nor shall thy guidance not conduct our feet,
O honour'd SHEPHERD * of our later days !

Whom from the flocks, while thy untutor'd soul,
Mature in childhood, trac'd the starry course, 35
ASTRONOMY, enamour'd, gently led
Through all the splendid labyrinths of Heaven ;
And taught thee her stupendous laws ; and cloath'd
In all the light of fair simplicity,
Thy apt expression.—Hail, ye friends of men !
Who, while ye liv'd on Earth, rang'd Heaven, and
brought

The Hours, the Days, the Year to regulate
The life of mortals ; taught the doubtful ship,
Secure, to steer the immeasurable deep :
And bath'd the mind, immers'd in ignorance, 45
In the pure river of celestial truth ;
That they might know themselves, the World, the Sire
Of universal being : and thus rise,

* V. note.

Fruitful of good, by gradual advance
 The golden age of wisdom and of bliss.
 Thine be the praise of ever-growing worth,
 O, my EUDOSIA! Thus the stars are won;
 Thus all the heroes of Philosophy
 Have triumph'd over fate, and blest'd mankind.

We see by night the lucid Host of Heaven 55
 Unveil'd; and through the gloom unnumber'd beams
 Pour on the eye; and, far as mortal view
 May trace, disclose the palaces of Gods:
 Yet not too much trust to appearances,
 Whoever would behold the form of truth
 In all her native beauty: for the sense,
 Fallacious, often deviates; till the soul,
 Exerting her supreme prerogative,
 Dispel the mist: and, brighter than the Sun,
 Nature shines forth, reveal'd in all her charms. 65

If to the fight we trust, whatever star
 Strikes on the vision from yon azure height,
 Revolves in one great orb with daily whirl *:
 But if to fight clear Reason lends her ray,
 Then varied distances, and different ranks,
 And diverse motions are beheld distinct;
 Which to one orb would rashly be refer'd,
 And to one orb already have been prov'd
 Not to belong: which Evidence more full

* V. note.

Hereafter shall illustrate beyond doubt,
Though Incredulity herself were judge.

75

Yet, though the motion, distance, magnitude
Of heavenly bodies thus diversified,
Midst order feasts with rich variety
The still enquiring, still delighted mind,
We dream not that the Stars choose each his course;
As in the sea the finny habitants
By native impulse, and self-moving will:
For, to the movements of the living world,
Free range agrees, direct or retrograde;
Now to the right, now to the left inclin'd;
Now straight, now curve; irregular and prompt
To every changing impulse of the sense:
And intervals of sweet returning rest
Are theirs; but ever circular the curve,
Constant the progress of those Stars which move,
And undisturb'd the station of the fixt,
Through the long period of a thousand years;
Except so far as the eternal law
Of Gravitation's universal force
May act on these; incredible how slow.
For not unsteady or precarious laws
Rule Heaven; nor space uncertain; nor return,
At vague, inconstant period, is allowed
To the unwearied messengers of light,
The planetary Worlds: and, as the form
Of animals by Nature's plastic hand
Is to their several situation turn'd;

85

95

Their

Book II. EUDOSIA.

35

Their temper, life, and services design'd;
So to the movement of the Stars is given
Adapted shape, compact and uniform,
Free for progression; aptly to diffuse
Light on all sides ordain'd; nor less to suit
Rotation, than for periodic course;
Sublime and beautiful, a Sphere complete.

105

Since, therefore, nor spontaneous motion reigns,
Nor Chance the Stars directs—ideal Being
Worshipped by credulous Impiety—
But fix'd their periods, and unchang'd their laws,
Their motion constant, figure uniform;
Remains that *one eternal Mind* preside,
Impel, direct, and limit all their course.

115

See we how in the midst *five* shining orbs
Appear to wander, circling round the *Sun*.
First, *Mercury*, rarely beheld, and hid
Beneath the neighbouring radiance of his beam;
Seeming to glance upon the fervent goal
In the swift flight of his impatient wheel:
Then the bright Star, the harbinger of day,
Which, when she leads the lovely hour of *Eve*,
Is *Venus*, queen of joy: inferior *Earth*
Borrows the cheering ray, O *Sun*! from thee,
Sovereign and parent, animating all:
Next *Mars*, of fiery red; and *Jupiter*,
Of vivid lustre in his ample orb:
Saturn, the last, with faint and livid ray

125

E 2

Slow

Slow moving in the System's utmost bound.
Far above these, the Glory of the Heavens,
With thousand lights, sheds splendor through the dusk,
And drives far off the horrors of the night; 135
Lest darkling, the lost traveller should err,
Or the wide seas the mariner deceive;
And that the Wisdom, Goodness, Power of God
To mortals may be known; and Nature speak
Her great Creator; and through all her bounds
His every work or learn, or teach his praise.
What, then, with these examples may become
Man, before whom the *Deity* hath set
This boundless scene? Shall he not cultivate
The seeds of Truth and Peace? Shall he not dwell 145
With genuine, active Piety, and gain
The habit and the temper of that life,
For which he is design'd?—the life of Gods!
Looking sublime to the high seat of bliss,
Where neither Sickness, Grief, nor anxious Care
Disturb the pure serene; but Ease secure,
And Life, unknowing of decay or end,
And Peace, and Love reside; and the great Power,
Eternal *Virtue*, driven by our crimes
From Earth to her corruptless mansion—Heaven. 155
Hither our journey; here our sacred Port;
Hither, disdaining every obstacle
Of terror or allurement, let us tend.

Meanwhile, so far as human duties grant,
And the blest care to benefit mankind;

—Nor

—Nor little serves Mathesis to that end,
 And the fair Study of Astronomy—
 Let us admire this ample theatre,
 Let us revere the glorious *Universe*,
 His *Temple*, who pervades immensity. 165
 Nor thou, a stranger, wilt approach; nor me
 The attempt can fail to please. Great is the task,
 Arduous, long, and little trod the way;
 But rich the fount, and by *Urania* lov'd,
 Which he, who perseveres, shall taste; imbued
 With immortality. Amidst the din
 Of Avarice and Strife sweet is the view
 To turn the eye, pain'd with our country's woes,
 From guilt, dishonour, misery, and blood,
 To Heaven. O ENGLAND! re-assume thy strength
 Of innocence, thy independent spirit; 176
 Look to the Stars, and rule within thy sphere
 Of self-dominion; cherish Liberty,
 And be the friend of nations—not the scourge:
 Then shalt thou reign pre-eminent, and lov'd,
 Till the vast fabric of the World expire.

The PERIODS * of the PLANETS to discern,
 Nice is the toil; but not inglorious.
 First, winged *Mercury* in haste revolves;
 Three months, with little space beyond, include 185
 His Circuit: *Venus*, in an ampler orb,
 Measures eight months: *Mars*, free, expatiates
 Two lunar years: imperial *Jupiter*

* V. note.

Nearly

Nearly *twelve years*, such as our annual course
 Numbers, within his mighty orb includes:
 While *Saturn*, to the dreary marge exil'd,
 Requires *thrice ten* to fill his slow career.
 Nor *Poetry* these numbers will disdain,
 Since *Harmony*, her sister, these approves;
 In perfect scale most musically true: 195
 So sweet a concert regulates the spheres.
 Justly, O KEPLER! are the ides of May*
 Rever'd, which taught to thee this wondrous truth.
 Whatever the Octobrian ides may boast,
 Which gave the second HOMER to mankind,
 Thine shall not yield, nor boast inferior fame:
 Whatever praise the ides of March demand,
 When godlike BRUTUS smote his tyrant friend,
 And paid the price he valued more than life,
 To purchase SACRED LIBERTY for Rome; 205
 Short was that Liberty, and soon obscur'd,
 Soon quench'd by days malign, and men of fraud:
 But the pure beams of thy discovery,
 Nor fraud, nor time extinguish or obscure.
 'Twas thine to mark the track, and point the way,
 Fated for NEWTON; whom Astronomy
 Will'd to explain her laws divine, and draw
 Order, Proportion, Beauty, Greatness, Truth,
 Science, and Virtue from the Heavens to Earth.
 Hear, then, O studious of the Harmony, 215
 Which leads our system in mysterious train!
 Hear, and receive the great KEPLERIAN rule.

* V. note.

*Such as the Cube of numbers that express
The distance of each planetary Sphere,
Such is the Square of periodic time.*

Now, therefore, now explore the distances;
And, as the shadow of a staff can speak
The height of the proud Memphian pyramid,
Learn by analogy to comprehend
How distant are the planets. KEPLER now, 215
HALLEY, and NEWTON our bright Cynosyre,
Lend their conspiring rays, and teach to find
The *Parallax*, or angle of degrees
Of Earth seen from the Sun: the assistant tube
Of GALILEO on the task attends;
Not yet two Centuries the boast of Earth.
Thus much appears: the angle, which we seek,
Is most in the Horizon, for it then
Is right; and thus our object is to find
The Horizontal Parallax distinct; 219
Which, by the Quadrant and the optic tube,
Yields to our search: and, if this Parallax
Give to the Radius of the Earth, no more
Than as *two seconds* of a just degree,
Even by this the distance from the Sun
Is *eighty millions* of our miles complete:
As true proportion clearly will evince.
Now seek we *Mercury*, how far remote,
Comparing when most distant from the Sun,
His place as noted on the Earth; and this, 249
Adjusting to the solar station, view'd

Alike

Alike from Earth, the distance is obtain'd,
 Unless so far as the Mercurian orb
 Deceives, *eccentric* in a small degree.
 And the same rule to *Venus* will apply :
 For, howsoever in the practice nice,
 The *principle* of Parallax is clear,
 Simple, and certain, resting on this base
 Of evident and self-evincing truth :
 That objects, as they grow remote, are seen 255
 By rays incessantly *converging* more :
 And thus the Angle is diminished still,
 As the retiring object shuns the sight.
 Of *Jove* the distance, and the magnitude,
 The GALILEAN tube determines best ;
 Observing his bright cohort of faithful guards,
 Justly entitled his *Satellites*.

But of all means to trace the latent truth,
 None more approv'd, or of more happy thought,
 Than that which *Venus*, to the curious gaze 265
 Of philosophic eyes, affords : though rare,
 In *transit* o'er the Sun's illustrious disk,
 She passes, and to us beheld, appears
 Spoil'd of reflected light, in ebon shade :
 Nor to our age has fate denied this scene.
 Grant me the prompt attention of the mind,
 While I describe events, untaught to yield
 To the soft graces of poetic lore.

This

This spectacle HORROX * beheld the first :
 Whom, to the Earth scarce shewn, inclement Fate 275
 Withdrew, as meriting an higher sphere.
 A century and forty years have pass'd
 Since that conspicuous æra : the return
 Of the distinguish'd scene HALLEY * foretold ;
 Which now the lapse of *nineteen* years has pass'd :
 England and rival France, admiring, watch'd
 The important prodigy ; when the *sixth* day
 Had dawn'd propitious on the *Jupian* month.
 Let me explain the cause and the design
 Which pointed Observation's eagle eye 285
 To this Phænomenon ; and thou direct,
 O FERGUSON ! than whose no beam more clear
 Pierces the gloom, where Science is conceal'd.

First, then, is manifest, that *Parallax*
 Denotes the difference of the real place
 From the apparent ; in meridian height
 It vanishes ; increasing still from thence
 To the Horizon : hence, we learn the Moon,
 What is her size and distance from the Earth.
 A kindred mode might trace the distances 295
 Of all the other Planets with like ease,
 Were they not so remote, as scarce to yield
 Angles discernible to human sight ;
 Though best supported by the Optic art :
 But the conjunction of the Star of Eve
 With the all-radiant Sun, more evident,
 More certain gives the distance to be known.

* V. note.

F

IF

If constantly, at each conjunction pass'd
 O'er the Sun's disk, the mild Hesperian Star,
 Of these conjunctions in the inferior orb, 305
 Less than six hundred days give the return;
 So often would her transit o'er the Sun
 Be to the Earth conspicuous: but *two* points
 Of the Ecliptic, by her orbit cut,
 Alone admit this rare eclipse: and these
 Of *Venus* are the *Nodes*; a term reserv'd
 For use more general, when we speak the cause
 Which veils the Moon within the shade of Earth,
 Or hides the Sun by *Luna* interpos'd:
 At every other time she glides above 315
 Unseen, or passes unobserv'd beneath.

If, then, the *parallactic* angle fall,
 As latest observation testifies,
Eight seconds on the solar disk allowed
 The just encrease of a fix-hundredth part alone:
 The distance thus of *Venus* from the Sun
 Is *seventy millions* nearly of our miles:
 An *hundred* makes the Earth's withdraw but *five*:
 And thus, observing the *KEPLERIAN* law,
 The distance of the rapid *Mercury* 325
 Is more than half of that which the fair orb
 Of *Venus*, from the Sun in line direct,
 Traces: and *Mars*, by more than twice, exceeds
 The distance of his favourite star: much more
 The *Jovian* light is distant from the Earth,
 Since nigh *eight times* the distance, which divides

The

The sphere of *Venus* from the solar ray,
 He wanders in his ample space : beyond,
 Stern *Saturn* holds his solitary reign,
 In miles *nine hundred millions* from the Sun. 335

Think of these orbs; the speed ! *Saturn*, who moves
 Slowest, exceeds incredibly the flight
 With which the cannon hurls the balls of death,
 And levels proudest turrets in the dust :—
 For scarce that speed equals the *fortieth* part
 Of *Saturn's* progress ; though allow'd to fly
 Nearly *five hundred miles* within the hour :
 But *Jupiter* in his velocity
 One *fourth* exceeds : and *Mars* impetuous flies
 With nearly *twice* the speed of rapid *Jove* : 345
 Our *Earth* by more than *thrice* exceeds the course
 Of *Saturn* in velocity ; while moves
 The silver-footed *Venus* with a bound
Fourfold more rapid than the tardy God :
 And *Mercury*, in full career, outstrips
 The progress of the chill *Saturnian* star ;
 Exceeding in *one* hour his range of *five* :
 Scarce in *two hundred* hours the fiery ball,
 Urging its irresistible career
 As swift as when it fled the cannon's mouth, 355
 Would pass the space which *Mercury* in *one*.

The computation will proceed the same,
 Of Distance and Velocity, to him
 Who the *Diameter*, as seen from Earth,

Of *Jupiter* or *Saturn* would explore :
 And thus the *periodic Square* agrees
 With the *cub'd* distance : thus but know the times
 In which two Planets in their Orbit roll,
 And their respective distances are known.
 Hence too, we learn that *Earth*, revolving, moves 365
 About the *Sun* : for certainly the *Moon*
 Revolves around the *Earth* : and if the *Sun*,
 Revolving, circled round the central *Earth*,
 Should not the *periodic* times conform,
 Proportion'd to the distance by this law ?
 But near *three hundred* times the *Sun* exceeds
 The distance of the *Moon* : and thus the time
 Of his full period were *four centuries*,
 And *fifty* years exceeding, by the rule
 Of Distance and adjusted Period. 373

But not the *annual motion* is alone
 Given to the Planets; on their axle each,
 Whirl'd by progressive force, for ever rolls :
 This to the sense in *Mars* is evident;
 In *Jupiter* and *Venus* : thus the *Moon*
 Rotates : and thus the *Earth* : *Earth*, in the space
 Which measures to our senses Day and Night
 Of *twice twelve* hours : the other Planets each
 In varied space ; a day and night to them :
 The *Earth* and *Mars* nearly in equal time 385
 Whirl round their several axis : while the *Moon*,
 In slow rotation, spends nigh *thirty* days:
 And *Venus* by few days in smaller space,

Wheels

Wheels her self-balanc'd sphere: the mighty *Sun*
 Scarcely exceeds the circling time allowed
 To the light axle of the Evening Star:
 But, swift beyond conception, *Jupiter*
 In *nine* short hours whirls his enormous orb.
 Nor slightly the Rotation of the Earth
 Affects her spheric form: for hence the whirl, 395
 Swiftest where most at distance from the Poles,
 Reduces the diminish'd gravity;
 And highest here the force centrifugal.
 Thus Earth becomes a *spheroid* oblate;
 And therefore Pendulums beneath the line
 More slowly vibrate. Mensuration last,
 Of equatoreal with the polar space
 Compar'd, establishes the theory,
 And testifies, what countless proofs declare,
 The fine exactness of NEWTONIAN art *. 405
 Far more the equatoreal axe of *Jove*
 Exceeds his Polar: such the fiery speed
 Of his diurnal orb, more rapid found
 In vast rotation, than progressive course.

Consider now the various Magnitude
 Of the great bodies in our System plac'd;
 And, lest Exaggeration seem to err,
 Suppose the Distance by one *sixth* beneath
 The former computation, still the *Sun*
 Nearly *eight hundred thousand* miles will fill 415
 In vast Diameter: while *Jupiter*
 A *tenth* of this great line nearly completes;

* V. note.

And

And thus contains, in solid magnitude,
 The *thousandth* part of the stupendous *Sun* :
 As *Earth* the *thousandth* part of *Jupiter*.
Saturn our *Earth* *six hundred* times exceeds :
 And *Venus* nearly equals : ruddy *Mars*,
 Inferior far, scarcely *four thousand* miles
 O'erpasses in Diameter : yet less
 The Sphere of fiery *Mercury* ; and near 425
 The *Moon* in magnitude, whose total orb
 Hardly contains the *fiftieth* part of *Earth*.

The *Distance*, *Period*, several *Amplitude*
 Are measur'd thus of the amazing orbs,
 Which grace our SYSTEM. O GEOMETRY,
 Of humble source, and name too limited
 To comprehend thy heaven-extended reign !
 O Friend of human life ! Shall I believe
 The Muse to thee averse, or think of thee
 As hostile to the Muse : sweet the consent 435
 Of lovely arts ; the elegant, the deep,
 The popular, and the retir'd, combine
 In friendly Union and true Harmony ;
 Supported and adorned by mutual aid :
 Fair symmetry, and rational delight,
 In truth and order plac'd their common end.
 Shall the Muse rather, from her sacred height,
 Descend to breathe the strain of guilty joys ;
 And bow to Avarice, to Luxury,
 To Fraud, to Violence : and flatter Kings ; 445
 And praise their triumph o'er subverted laws,

The

The venal Senate, and the Land enslav'd?
 The mighty works, the praise of the Supreme,
 These be it her's to sing; her Glory this,
 To chant the wonders of the Universe,
 And give the Arts, which grace and bless our life,
 Eternal memory; and represent
 Their living image in its brightest form:
 Her's be it to exalt the heroic band,
 Whom not the trophies rear'd by cruel guile, 455
 Not the mad triumph of the bleeding field,
 And nations, sunk in death and servitude,
 Distinguish; but the deeds of peace and truth:
 These, she will celebrate, whom she hath seen
 Thy Friends, divine Philosophy, and true
 To Nature; lov'd of Virtue and of God.
 O, in what verse shall I record your names,
 Ye Stars of human race!—But, since your souls
 Are far beyond mortal reward or praise,
 Let us aspire, so far as best we may, 465
 To imitate: and now, proceeding, mark
 The vestiges your honour'd feet have left.

We said the SUN upon his Center turn'd:
 This by apparent spots is manifest,
 Retiring and returning to our view,
 At measur'd periods on his orb of fire:
 Sometimes so wide encroaching, that the Earth
 Measures one *third* of their diameter.
 Yet not the Sun by their encroachment shines
 With lessen'd beauty, or appears to lose 475
 Of

Of heat or splendor: as a grain of sand
 Deforms not the bright surface which presents,
 In ample model, this our globe of Earth.
 Of *Mercury*, the great vicinity
 To the resplendent fountain of the day;
 Of *Saturn* the remoteness, haply veil,
 And long may veil, the rotatory course.

But not Rotation and the *annual* course,
 And the soft lustre of attendant Moons,
 Are the sole means which give the planets Light, 485
 Temper their Seasons, and dispense their Day:
 Their several Orbits, wondrously *inclin'd*
 To the Ecliptic, and their *Axle* turn'd
 To their respective Orbits, point the hand
 Of perfect Wisdom: *Venus*, most of all,
 Inclines her axle in her solar road;
 But to the Ecliptic is her orbit bent
 With gentler inclination; long her days,
 Since less than *ten* measure complete her year;
 And various are the seasons, which advance 495
 In quick procession round her cheerful orb:
 The inclination small, or none, which bends
 Thy axle, *Mars*; and little seems oblique
 Thy orbit: little is the bent, if ought,
 Which turns the axle of thy car, O *Jove*!
 Wheeling in spacious progress through the Heavens:
 Or tracts exceeding far this globe of ours,
 Near both thy poles must suffer horrid night
 For the long period of *six* frozen years.

But

But what the light, imparted by the Sun 505
 To these attendant planets, now remains
 That we behold; and note their surfaces,
 Darkling, or vivid with the potent ray.

Seven times the light, which gilds our Moon, in-
 flames

The fiery sphere of ardent *Mercury*:
 While *Venus*, brilliant with a double share
 Of solar splendor more than beams on us,
 Graces the Heavens: *Mars* has but half our light
 Pour'd on his dense, refractive atmosphere:
 And *Jupiter* gains scarce a *thirtieth* part; 515
 Yet quick returns compensate, and a Night
 Illumin'd by *four* Moons, assiduous still
 To shed successive light, and cheer his globe
 On every side; except the Poles alone;
 And these the Sun never abandons far,
 But sojourns on the horizontal marge
 In kind vicinity, indulging light:
Saturn receives a *ninetieth* part alone
 Of the all-cheering light on Earth diffus'd;
 But *five* refulgent Worlds solace the Sphere, 525
 With distances and periods strictly true
 To the great law, O *KEPLER*, trac'd by thee!
 And how illustrious is the ring, which girds
 His ample orb! amazing Zone of Light!
 Auxiliar to the circling Moons that wait
 Upon the mighty Planet. This sublime,
 This glorious Zone, which thus surrounds the sphere

Of *Saturn*, philosophic eyes have deem'd
 A numerous band of bright *Satellites*;
 Contiguous seeming to the sight: as oft 535
 To the admirer of thê rural scene,
 A verdant cluster of fair rising trees;
 Though, to the nearer eye, their intervals
 Give spacious freedom for each youthful stem
 To spread the vast luxuriance of its shade:
 Others in this, as in the various change
 Beheld in *Jupiter*, with awe collect
 The tokens of that dread vicissitude,
 Which not content to triumph over Earth,
 And all that it inherit, ranges Heaven, 545
 Deluges Planets, fires eccentric Worlds,
 And in chaotic Darkness buries Suns:
 These judge the girdle of the mighty Star,
 But the remaining fragment of a globe,
 That once was *Saturn*; till by sudden shock
 Of inundation broken: nor the SUN
 Is thought to want a like investiture,
 To which conjecture has referr'd the Light,
 Like the pale gleamings of the comet's train,
 Which near the Zodiac beams, when Equinox 555
 Holds the just balance: but unnumber'd rise
 The pleasing prodigies in Heaven and Earth,
 Which philosophic Certainty despairs
 To call her own, or trace the ambiguous cause.
 But, whatsoever various cause of light
 Gilds the *Saturnian* sphere, upon our *Earth*,
 Sufficient that a single guard attends,

Book II. E U D O S I A.

51

Dispensing nightly radiance: while her days,
So well attemper'd, and her moderate sphere
And distance nor excessive, nor too small,
Haply entitle her to claim, with cause,
A blest pre-eminence o'er other orbs.

565

Justly conform'd to geometric rule,
Safely depends upon experienc'd truth
The important principle by which we learn,
The Planets own their several *Densities*,
Adapted to their distance from the Sun.
Five times in *Denseness* yields vast *Jupiter*
To *Earth*; and *Saturn* equals not a *sixth*:
While *Mercury* not ill we may divine
Of Density superior to the Earth.
Hence haply varies, in no small degree,
The quality of light received; to suit
With the dense, nearer substance; nor consume
Its solid texture; or reflected dance,
On the rare surface of the more remote,
By the less heavy atmosphere enlarged.

575

END OF THE SECOND BOOK.

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E U D O S I A.

B O O K III.

THE SEASONS AND THE ZODIAC.

WITH THE ZONES; THEIR TEMPERATURE,
AND ITS EFFECTS.

THUS far, EUDOSIA, have we rang'd at large
The vast of Heaven! but now we slack the rein,
And from the summit of the humbler Earth,
Bound the immensity of ambient space,
And circumscribe the UNIVERSE; while breathes 5
The spirit of the animating Sun
Upon our toil; the waving, leafy grove
Nurtures sweet contemplation; and the mead,
Rich in its verdant honours, all invite
To view the Globe on which we live, and trace,
In the fair chrystal of surrounding Heaven,
The paths where dance the jocund Hours, and wind
Their even circles; where the *Seasons* sport;
Whence Love, and Venus, and the Graces shower
Delight and joy, and every elegance 15
Upon us, favour'd habitants of Earth;
And, in their festive train, immortal Youth
Smiles, Patron of the still renewing year.

Though

Though to these studies neither Time, nor Place,
 Season, or Age, or Country disagree :
 The Temple of the UNIVERSE to all
 Expands her awful portals : and to Man,
 Wherever born, alike a citizen
 Of the great World, equal the privilege
 To honour Nature, and explore her laws. 25
 Nor does the wintry chill this joy forbid ;
 Nor Summer, darting from the ardent rock,
 Withering, with eye of flame, the torrid soil
 Of Mauritania : ATLAS, I attest
 Thee witness of this truth : thee, frozen North,
 From whom BRAHÆUS * and COPERNICUS
 Have beam'd upon the Earth : nor, though too fond
 Of arbitrary system, rais'd by strength
 And subtilty of human wit, in truth
 Unfounded, and in vain elaborate; 35
 —Nor from an error of a different kind,
 Of trusting to the sense too much, exempt—
 Not thee, O PTOLEMEY, Egypt alone,
 But all the earth, and every age to come,
 Shall boast; sagacious, accurate, and wise !
 We fight not with a foe ; Nature we seek,
 Who wills that Man be ever friend to Man ;
 And that Philosophy and sacred Truth
 Temper our hearts to mutual amity,
 In sentiment however disagreed. 45

An axle through each POLE produc'd to touch
 The starry Orb, one point sublime to North,

* V. note.

The other to the South direct oppos'd,
 By name the *Arctic* and *Antarctic* stil'd,
 We view in fancy 'midst the boundless Void:
 Whence, by Degrees nearly twice twelve, remote,
 A Circle runs with appellation borrow'd
 From either Pole: two other ample Lines
 Cut the great Sphere with more extensive range;
 Where, by the watry *Crab*, the Sun ascends, 55
 Lengthening the shadows, and protracts the day;
 Till by a gentle bend the ecliptic curve
 To *Capricorn* retires, and Darkness wins
 Upon our regions: to the Points oppos'd
 Upon these Circles, names we give, conform'd
 To the appearance; such as would agree
 If the Sun mov'd, and Earth in central rest
 Stood. When the former point the Sun commands,
 Since never on the Northern hemisphere
 He shines with ray so full, this æra marks 65
 The *Summer Solstice*: the like name we give,
 And call the circle by its proper term,
 The *Summer Tropic*, or by *Cancer* note.
 The *Winter Tropic* by like cause to us
 Is that of *Capricorn*; by Grecian terms
 Thus dignified, since, from the station gain'd,
 The Sun one while to South appears to turn,
 Deserting us; and then, from South he leaves
 Our *Winter Solstice*, and returns to North:
 These circles at an equal distance guard 75
 The Equator on each side; as from the Pole
 The Polar circles stand remote; and midst

From

From East to West, and thence to East revolv'd,
 Winds equally remote from either Pole,
 Midst both the Tropics, that distinguish'd curve,
 The EQUINOCTIAL or Equator call'd.
 To this *oblique* the *ecliptic* circle runs,
 Both Tropics intersecting, where they form
 The two *solstitial* points: thus with *five* bands
 The Heavens and Earth are mark'd; at equal spac:
 Each separate from each, and parallel: 86
 While two Colures—the one, from *Libra* drawn,
 Oblique to touch the Polar circle, runs,
 By name the Equinoctial; and the second,
 Ninety degrees exact from this remote,
 Term'd the Colure solstitial; by these
 The *Ecliptic* in four equal parts is cut,
 To the four Seasons severally assign'd.
 Within the first of these great parallels,
 Which thus *Urania* from the Pole describes, 93
 The *frigid* Zone is spread: the *temperate*,
 Larger by far, within the *second* reigns;
 But yet of ampler area is the *third*,
 Expanded to the LINE: the *torrid* Zone
 Between our Tropic and the Equator plac'd:
 The *fourth* the Southern *torrid* Zone contains:
 The *fifth* the *temperate*—though but as one
 Are both the *torrid* Zones by most esteem'd,
 Since each to each contiguous—and thus
 The Southern *temperate* becomes the *fourth*: 105
 Last is the *frigid* Zone beneath the South:
 And these to their inhabitants impart,

As more oblique, or more direct, they meet
 The solar ray, a *Winter* of their own,
 Or an eternal *Summer*: little chang'd
 By the revolving Seasons of the year;
 And what of Cold or Heat the *temperate* Zone
 Experiences, to them appears compar'd
Spring, if the *frigid* Zone were to decide,
 But *Winter* if the *torrid* were the judge. 115
 Within the *temperate*, vicissitude
 Of *Seasons* most prevails; delightful change,
 Gradual; free from each severe extreme!
 When, in the gloomy sign of *Capricorn*,
 The Sun faint glances upon us his ray,
Winter, forth creeping from his Northern cave,
 Scatters the heavy icicle, and binds
 Reluctant waters in his iron chain;
 While *Boreas* shakes the leafless wood, and rolls
 The stern resounding billows o'er the sea; 125
 And a dim dawn closes the tedious night:
 Then those, who near the adverse Pole observe
 The Southern Dragon o'er their heads, sublime,
 Enjoy their *Summer*, at the time when reigns
 O'er us the wintry Season: there the vine
 Shrinks from the ardor of the day, and hides
 Her blushing clusters: and the frolic sheep,
 Panting, implore the shelter of the vale.

Now, while gay Fancy sees the Sire of Day
 Journeying in sovereign State his *annual* road, 135
 Let us pursue the splendid track: behold,

H

Ye,

Ye, who admire the wonders of the Heavens,
 The lucid *Zodiac*, twelve degrees in breadth,
 The fam'd poetic mansions of the Gods.
 We visit and admire the radiant path,
 Where, to Imagination's glowing eye,
 Moves the great Ruler of the varying year ;
 And Time and Life follow his golden car :
 Here too the silver *Cynthia* delights
 To change her form : within these limits range 145
 The Planets, and in mystic dance revolve.
 The other circles, which the art of man
 For various purposes assigns to Heaven,
 Airy creation of the ductile thought,
 Have in the skies no correspondent trace :
 But here, enrich'd with heavenly gems and gold,
 Shines the *conspicuous circle*; and invites
 Admiring eyes : while, through the solemn gloom.
 It sheds a strong effulgence o'er the year,
 Progressive ; giving to the expectant sight— 155
 Whether the *Winter* or the *Summer* rules,
 Or *Spring* or *Autumn* * equal day with night *—
Six of the Signs, which fill the splendid round,
 Disclos'd, and *six* the hemisphere conceals.
 This ancient Industry in *twelve* just parts
 Distributed ; assigning each their name ;
 And pleas'd to give symbolic character,
 To each adapted : thus Philosophy
 Fill'd the surrounding line with living forms

* V. note.

Derived from Earth ; and Zeal, too prone to err, 165
Worship'd the specious miracles unknown.

First, from the East, the *Ram* conducts the year;
Whom *PTOLEMEY* with twice nine stars adorns,
Of which two only claim the *second* rank :
The rest, when *Cynthia* fills the sign, are lost.
Him Jupiter for old fidelity
Is fam'd to have advanc'd amidst the stars ;
Or *Bacchus*, when he rang'd the *Lybian* wilds,
And by his guidance found the stream desir'd :
But rather emblem of the *vernal* hour, 175
By hieroglyphic wisdom plac'd, he stands.
Next flames the star of the *Sidonian Bull*,
Whom the five *Hyades* with watry urn
Sprinkle : his dewlaps glitter, his broad back
Lightens with stars ; nor want his feet the grace
Of splendid *Luminaries* : thus he shines
Image of husbandry, which now subdues
To cultivation the advancing year :
A star of the *first* magnitude illumines
His radiant head ; and of the *second* rank 185
Another beams not far from this, remote.
Next shine, reveal'd, the fam'd *Ledeans* pair ;
One most illustrious star adorns their sign,
And of the second order shine *twin* lights,
Of which, when *one* yet lingers in our Heaven,
The *other* sinks beneath the wave conceal'd :
And, when the *one* emerges to our sky,
The *other* lingers yet beneath the way :

And hence the Fable of alternate death,
 And fond redemption purchas'd each for each, 193
 By the free offering of fraternal love :
 Thus they, conspicuous in the starry rank,
 Are seen, fit image of the Spring mature ;
 Season of Gaiety and youthful Grace.
 Next comes the *Crab*, whom Hercules, when urg'd
 By the Lernean Hydra, Fame reports,
 Slew, with his wiles incens'd ; for Juno sent
 The despicable mischief to annoy
 The hero ; but Philosophy, more just,
 Adopts the signature to represent 205
 The retrograde condition of the year,
 As the Day shortens, and the Season hastes
 Backward to *Winter* tending, when the Sun
 Hath pass'd the *Summer Solstice* in that sign.
 Next flames the terror of the Nemean field ;
 Two splendid stars of highest dignity,
 Two of the second class the *Lion* boasts ;
 And justly figures the fierce Summer's rage.

Next, with the Sheaf, the *Virgin* graces Heaven,
 Bearing the spoils of harvest ; which the Earth, 215
 Now to the wishes of the gleaner, yields,
 To succour Poverty ; perhaps support
 Beauty and Worth, that blossom unobserv'd
 In the cold pining vale of Indigence * :
 But Poetry assigns the awful form

* See the pathetic story of *Lavinia* in THOMSON's admirable
 Poem of the *Seasons*.

Of Justice to the fair celestial maid :
 Her lovely tresses glow with starry light ;
 Stars ornament the bracelet on her hand,
 Her vest, in ample fold, glitters with stars,
 Beneath her snowy feet they shine ; her eyes 225
 Lighten, all-glorious, with the heavenly rays.
 But first the star which crowns the golden sheaf,
 And wants a name, O glory of the skies !
 And shall not Justice dignify thy sphere
 With the great name of NEWTON ? Be at least
 To me for ever the *Newtonian Star*.
 He to the starry height triumphant soar'd,
 The laws of subtile light and colour trac'd,
 The motion of the Earth ; the secret chain,
 Drawing the planets round the central Sun : 235
 He gave to Earth, to view without dismay
 The flaming comet ; the obedient Sea
 Confess'd to him the great mysterious law,
 Which regulates her tide ; to him the Moon
 Reveal'd her complex orbit ; Space in vain
 Strove to conceal the wondrous distances
 Of planetary worlds ; his piercing eye
 In comprehensive glance travell'd the stars,
 And saw unnumber'd Suns : he from the Heavens
 Charm'd true PHILOSOPHY to visit Earth, 245
 And by example shew'd how amiable
Wisdom with *Goodness* join'd * : patient and mild ;
 Benevolent ; to genius ever kind ;
 And only to himself, and the great works,

* V. note.

The high discoveries of his mighty mind,
 Severe: he taught to know, and to obey
 The law of Heaven; nor word of his, nor thought
 Disjoin Religion from Philosophy:
 Envy he conquer'd by neglect of Fame,
 Simply content with being wise and good. 255

Fir'd with the thought of this immortal name,
 Let us proceed to trace the starry signs,
 And thence to higher lays exalt the song.
 The *Balance* next, where the Ecliptic cuts
 The *Equinoctial* in the Western point,
 Equals the Day and Night: one of prime ray
 Divides the *Scales*; two of the second class
 The modest sign contains; in brilliancy
 Less eminent, than friendly to the earth.
 Next in the rank the *Scorpion* behold, 265
 Emblem of *Autumn's* pestilential force;
 Him *Jupiter*, for fierce *Orion* slain,
 As mystic fables sing, plac'd in the Stars:
 For as the monitress of latent truth,
 Sweet Poesy, suggests, the Sire of Heaven,
 Detesting Violence and brutal Wrong,
 Amidst the stars exalts the conquerors
 Of Tyranny, deliverers of man.
 The Heart, with lustre of amazing force,
 Refulgent vibrates: faint the other parts, 275
 And ill defin'd by stars of meaner note.
 Next the swift *Archer*, whom poetic Greece
 Names *Chiron*, of *Astronomy* the son;

And

And teacher, far rever'd, of moral truth :
 Nor ill assign'd his station in the sphere ;
 For now the season of the *Hunter* reigns :
 But not conspicuous are the stars which trace
 His form. The icy *Capricorn* succeeds ;
 For now the Sun, as the wild goat ascends
 The craggy rock, is mounting towards the *Spring*,
 The *Winter Solstice* just elapsed : and now, 286
 Silent the season, sad *Alcyone*
 Builds near the sleeping wave her tranquil nest :
 The Earth submits to *Winter's* frozen arms,
 And dark December pours the treasur'd Snow.
 Languid the constellation and obscure,
 Beside *Aquarius* pours the inverted urn ;
 For now relenting Frost dissolves in rain :
 His head, his shoulders, and his lucid breast
 Glisten with stars ; and, where his urn inclines, 295
 Rivers of light brighten the watry track :
 One star of the *first* magnitude he boasts.
 Last the two *Fishes*, interwin'd, denote
 The near approaches of the genial *Spring* :
 And here the antient observation mark'd
 The *NODE* of Heaven ; since here the ending month
 Meets the beginning : these resplendent signs
 The Sire eternal in the Heavens plac'd,
 To note the *Seasons, Days, and circling Years*.
 Here runs the line which, in her course, the Earth
 Traces, and views the Planets in career : 306
 Now following with herself in equal line ;
 Preceding now, and then again behind ;

But

But keeping still within the ecliptic bounds,
 Nor ever ranging farther from the Sun.
 Not so the Moon, who Northward now declines,
 Now bends her silver axle to the South,
 And often, in returning, falls within
 The shade of Earth in her *ecliptic Node*;
 And often intercepts her brother's ray, 315
 Hiding our globe from the excluded Sun:
 Hence is this circle the *ecliptic* call'd.
 Remains the *Horizon*; which in fact recedes
 Ninety degrees from either Pole: but that,
 Which circumscribes the *sense*, is changeable,
 And varies ever as we shift our ground:
 And ever into equal parts divides
 Our orb; the hemisphere of North and South:
 Hence of the Sphere a triple form results.
 If the two *Poles* in the *Horizon* rest, 325
 That *Sphere* we justly call a sphere *direct*:
 And in this situation those who live,
 See every day and night the Heavens revolve:
 If the *Equator* coincide exact
 With the *Horizon*, this obtains the name
 Of a sphere *parallel*: to those who dwell
 Thus situate—one Pole beneath their feet,
 The other Pole directly vertical—
 Apparent motion is extinguished quite;
 And the vast UNIVERSE in total rest. 335
 But the *Equator* falls oblique, and makes,
 With the *Horizon*, angles which demand

A dif-

A different appellation * : one acute,
 Obtuse the other, we account this sphere
Oblique: one Pole remains for ever hid;
 The other, with a still conspicuous light,
 Directs the fearful vessel through the deep;
 And in this sphere we all reside, but those
 Who on the Equator live, or at the Poles.
 Innumerable lines, by Fancy trac'd, 345
 Pass through the Pole, and the *Horizon* share
 In equal parts: *Meridian* these are nam'd *:
 Since on the place to each appropriate,
 When the Sun darts from thence with ray direct,
Noon revels in full pride; the point oppos'd
 Marks the blank depth of *solitary Night*,
 When sea and air, birds, beasts, and men are still.
 Whatever cities in determin'd line
 Possess the same Meridian, still to these
 At the same hour *Noon* flames; and through the year,
 At the same hour, *Midnight* on all descends. 356

Nor thee let me omit, fair Prodigy,
 By antient poets celebrated oft,
 And stil'd the *Milky Way*; in Grecian phrase
 Renown'd the *Galaxy* *: to all the earth
 Thy beauteous arch beams in unclouded sky:
 Some think thee the refulgent road of Heaven—
 The path to the eternal seat of bliss;
 Where, freed from mortal pains, in peace secure
 The virtuous live with the celestial train: 365

* V. note.

I

And

And those, whom philosophic Industry
Hath taught, believe the path by stars o'erspread,
Thick sown; but too remote from Earth to blaze
With native splendor on our watchful eyes.

The *Zones*, which slightly by the Muse were nam'd,
When of the heavenly circles she discours'd,
Demand our more exact attention now.
The *middle Zone*, on either side diffus'd
Of the Equator, thought of old to *burn*
In steril waste, with no inhabitants, 375
How many wealthy states and populous tribes
Possess. See how the toiling, numerous throng
Draws from the mine the deep retiring gold;
And brings forth gems from the dire cave of Night,
To triumph, dazzling in meridian day:
See how the Earth her better riches pours,
Luxuriant fruits, boundless variety!
Here Ganges rolls his flood, and emulates
The lordly ocean: here the Indian tribes
Liv'd innocent, and peopl'd tracts immense; 385
Till European Avarice, and Fraud,
And Force invaded: o'er the fruitful soil
A thousand Myriads, ranging, satisfied
With vegetable produce Nature's wants.
O BRITAIN! where the brute creation liv'd
Secure, protected by the Indian Sage,
Was it for thee to drench the peaceful glebe
With blood of helpless, unresisting men?
And thou, O *Gaul*! forbear to edge the sword,

Or

Or turn its fatal point to other climes ; 395
 Where nations, to the dreadful art enur'd *,
 May gild a triumph with more specious ray.
 There British valour seek thy scene of war,
 If Liberty, press'd by unequal force
 Of numbers, call thy aid : and look where points
 The *Columbean* land, by name usurp'd,
America : here the *Peruvian* liv'd
 Unhurt, and happy, midst the burning zone,
 Beneath a watry veil of clouds : that land
 Nor blames excessive heat, nor angry blast, 405
 Noxious to harvest : fruits, exuberant,
 Cloath the blest soil ; and mines, too liberal,
 Attracting spoilers from our distant worlds :
 Nor is the genius worthy of contempt,
 Nor base the manners of *Peruvia's* sons.
 But thee, O *Mexico* ! can I o'erpass
 In silence, where the love of Freedom fought
 Against *Hespanian* discipline and arms :
 Thee too, illustrious *Egypt* ! the same Zone
 Includes ; abundant of the noble Vine, 415
 The Palm, the Orange, and the Citrean grove.
 O *Nile* divine ! I see thy glorious stream
 Rising : Fertility pursues the track ;
 And future harvests of unbounded store
 Rush in a happy deluge o'er the land :
 Here the victorious Greek not blush'd to rest,
 And *Alexandria* to the clouds aspires,
 Destin'd the seat of Empire and of Arts,

* V. note.

By the great conqueror, whose name she bears.
 But eminently blest the soil which lies 425
 Between the Tropic, which stern *Cancer* bounds,
 And the dark circle of the *Arctic* Pole :
 Happy beneath the gales of fostering Heaven,
 And by the Muse, by Mars, and Pallas lov'd :
 By Venus and the Graces ; BEAUTY here
 Reigns the just sovereign of the constant heart :
 Not the despotic tyrant of an hour,
 Or doubtful empress of the frozen breast,
 Too cold for passion, or too gross to feel
 The sole attachment, the pure ecstasy, 435
 The sympathetic glow, the tender ties
 Of the united soul. Here modest Love,
 And meek-ey'd Delicacy, Taste refin'd,
 The unutter'd charms of genuine Loveliness,
 And all the virtuous Sensibilities,
 Gay Innocence, Affection unprov'd,
 The unrepenting and unfading Joy,
 Hold their blest Empire : hence the Forms divine,
 Of smiling Nymphs, and light-rob'd Dryades :
 Hence Cytherea, rising, charms the Wave, 445
 And, o'er the dimpled Cheek, the gentle Brow,
 The eyes mild beaming, the enchanting Mouth,
 Play the delighted Loves : the Symmetry
 Of perfect Shape, the attractive Elegance
 Of the retiring Bosom, the soft Grace,
 And nameless winning tenderness of Air,
 Speak the unrival'd Queen : here Italy
 Beholds her Daughters with a conscious pride :

The

The Roman Majesty, the Sprightliness
 Of Florence, the Venetian Delicacy; 435
 But, O my country, who with their due praise
 Shall crown thy lovely offspring! fair, beyond
 The boast of Painting, or the ideal forms
 Which grace the Poet's vision? Who shall speak
 The sweet Simplicity, the polish'd Ease,
 The Taste, the Genius of the *British Fair*;
 Reserv'd, but not severe; modest, yet gay;
 The Bliss, the Honour of domestic Life:
 Endear'd to Science and Philosophy;
 But not in these losing their proper charms 465
 Of feminine Perfection: theirs the Heart
 To virtuous Pity tremblingly alive;
 Theirs the soft Speech, the sympathizing Look,
 The generous Charity, whose gentle Hand
 Pours Balm into the wounds of Poverty,
 Of speechless orphan Woe, and helpless Age:
 Theirs (never may that palm desert our land)
 Still be it to preserve the hallow'd flame
 Of filial, conjugal, maternal Love:
 Nor let dishonour'd Europe blushing own 475
 E'en British Manners faithless to the clime.
 Such are the glories of our temperate Zone!
 Within whose limits rose the *Grecian* worth;
 DEMOSTHENES the Attic lightnings hurl'd;
 SOCRATES taught; EPAMINONDAS bled;
 For general *Greece* expir'd LEONIDAS *.
 Within these limits rose imperial *Rome*:

* See Mr. GLOVER's admirable Heroic Poem.

Here her immortal LIVY told her deeds;
 Her great FABRICIUS aw'd the admiring foe;
 CAMILLUS dignified the *Exile's* name: 485
 Her SCIPIOS shone; first in the blaze of war,
 And equal in the happier hour of Peace;
 For Eloquence and civil Wisdom fam'd,
 For polish'd manners grac'd; and through the world
 For mild Humanity rever'd and lov'd.
 Here sprang the DECII: hence immortal soar'd
 Thy virtue, BRUTUS: here, combin'd in one,
 Sage, Statesman, Orator, and Patriot rose,
 In thee, O TULLY! Probity here fix'd
 Her seat in CATO's soul; and Fortitude, 495
 Exulting, pointed to the godlike man,
 Alone unshaken 'midst a falling world.
 Within this Zone was great COLUMBUS born;
 And the young Hero *, cherish'd by whose hand
 Commerce reviv'd, and Navigation dar'd,
 Quitting her narrow track, to embrace the world.
 Triumphant *France* beheld, with pride well-plac'd,
 LEWIS the Just *: and her fourth HENRY's reign,
 The *Corfic* and the *Belgic* virtue, soar'd
 To eminence, rival of antient praise: 505
 And *England's* Glory spread ten thousand stars
 O'er the pure boundless firmament of Fame.
 Her ALFRED and her EDWARDS dignified
 The name of *King*; while Liberty beheld
 The peaceful Olive and victorious Palm
 Mingling their honours o'er her rising throne:

* V. note.

In the effulgence of her awful might,
Her PYM, her HAMPDEN, and her SYDNEY beam'd;
And the free Nation shook proud Tyranny
Through all its realms, protectress of the world! 515
Thus shone the *Æra*, whence the historic Muse,
With eye sublime and elevated mien,
Exulting, points the glorious pyramid
Of Government, fix'd on the ample base
Of common right: Justice, and Equity,
And Wisdom blending their concurrent powers
To rear the sacred fabric, on whose height,
Supremely eminent, not selfish rule,
But public happiness and freedom sate:
Thine, *England*, Commerce and Philosophy! 525
Within this Zone thy ANSON, DRAKE, and COOKE
Arose, whose Navigation rounds the earth:
Within this Zone *Astronomy* relum'd
Her buried honours, and confirm'd her sway.
Beneath the *temperate* Zone Nature rejoic'd
In a new world to plant the British race;
And saw her Commerce, Industry, and Arts,
Her virtuous Manners and her Youth renew'd:
Thither, O Freedom! thy domestic flame,
The hallow'd band, urg'd by corrupted times, 535
To seek new shrines for the eternal fire,
Convey'd: and worthy of those Sires, to whom
Virtue was country in whatever clime,
And Liberty their home, the generous sons
In free assembly cherish'd high resolve;
Fought, died, and conquer'd in the common cause.

Here

Here PENN the commonwealth of Virtue built;
 Order, peace, love, and just equality :
 Here rose *New England*, emulous to prove,
 By deeds of worth, her title to that name : 545
 Here fair *Virginia* view'd her active youth ;
 And, from the Western bound e'en to the verge
 Of frozen *Canada*, midst the dire clash
 Of civil war, the fruit of peaceful days,
 United states, founded in full consent,
 Sprang to the wondering eye. O British steel,
 See by thy stroke the wounded WARREN dies !
 See where contending parties twine the wreath,
 And CARLETON venerates MONTGOMERY's tomb !
 O naval strength ! O arms ! in awful league 555
 Late join'd to vindicate the continent,
 What self-consuming force invades the land,
 Whence rich abundance, with exhaustless urn,
 Pour'd her progressive blessings on this isle ;
 The land, whom sympathy of blood and laws,
 And kindred constitution, and the love
 Of Liberty, had knit in dearest bond !
 Let not the dreadful sacrifice of blood,
 The Patriot blood of brethren, and thy own,
 Run ceaseless on the violated Earth, 565
 And cry to Heaven ! O may the social climes
 In free, and equal amity unite,
 And Interest, Right, and Nature be obey'd.

But while the Northern hemisphere can boast
 The clime, laws, manners of the *temperate Zone* ;
 The

While 'twixt the Tropic curve of *Capricorn*,
And circle bounding the *Antarctic* Pole,
The Zone hardly emerges from the sea ;
Nor Cultivation smiles, nor civil Life
Tames the rude waste, or bends the stubborn mind ;
Nor Honour waits on Virtue ; nor the front
Of awful Justice quells presumptuous guilt ;
Nor laws, nor property, nor social ties,
Nor Liberty exists : unnatural rage
Feeds man with slaughter'd man ; eager to feast
Upon his brother's quivering limbs, and quaff
The blood yet warm with sacred life. The beasts,
The Tyger and the Libyan Lion, shun
To satiate hunger on their kindred beasts ;
But Superstition and the savage heart,
Made by perverted reason more than brute,
And furious hate, impel to crimes like these :
Yet not of every better principle
Are these entirely destitute : for here
Patience, superior to Adversity,
Their wretched country better lov'd than life ;
And souls, presaging of Futurity,
Distinguish the untam'd inhabitants ;
And, howsoe'er deprav'd, declare them men :
Where, from the Polar circles to the Poles,
The *frigid* Zones extend, the antient world,
Conceiv'd the regions of *eternal Night*,
And lifeless desolation. Stern, indeed,
The real aspect of the chilly soil !
Much, destitute of trees and herbs, is bound

In horrid ice, and mountains year by year,
 For ages heap'd, of undissolving snow,
 The rude North wind scourges the dreary waste,
 And breaks with hideous crash the frozen main;
 But, bordering on the verge of the chill Pole, 603
 A race robust, and swarms of active men,
 Live; and their day is long: for many a month
 The Sun, unsetting, shines; in recompence
 For the long absence of his friendly beam;
 And the Horizon, not inert or weak,
 Encircled with a favouring atmosphere,
 His image long retains, and powerfully
 Refracts the glories of his absent sphere.

Nor Tygers there, nor furious Lions rage:
 Few poisonous herbs infest the stubborn Earth. 613
 Nor fruits of necessary use they want:
 Witness the honours of Siberian grain.
 Proud, and of firmest texture, stand their woods,
 The pine, the fir; nor population fails,
 Nor the rude peasants envy happier Suns;
 Nor need our arts to solace fleeting life.
 If the gay vine, and thy enlivening bowl,
 Bacchus, to them are foreign and unknown;
 Their nerves are firm; their vigour unrelax'd
 By thy seducing draught; fermented corn 623
 Supplies a beverage suited to the clime:
 Nor more they ask. The unmolested shore
 Rarely and faint hears far remote, secure,
 The dying thunders of the naval war.

Nor

Nor blood pollutes the ocean, save when urg'd
By want, and, fond of the bold enterprize,
Their hardihood subdues the struggling whale.
Hence smiles the social board, and courage glows
In the enliven'd cheek, warm'd with the sense
Of honest praise; the long, long night is chas'd, 635
And its chill soften'd by the blaze of oil,
Won from their captive prey: hence Commerce speeds
To wealthier nations, and, returning charg'd
With their expected stores, brings various aid
To solace and improve the inclement clime:
And when their Winter's night for months entire
Broods o'er the land, think not that total gloom
Possesses all; the imitated *Morn*
Gleams with still varying radiance o'er the sky
From the clear North, and beauteous prodigies 645
Fill the wide Heavens. See how the Zenith burns
With sudden conflagration! See, immense,
From a vast Arch, like a proud bridge design'd
To check the Danube, or the subject Po,
Unnumber'd stream the rays of vivid light
To which the splendor of the *Iris* yields;
Now purple, now in golden lustre, now
Softened to silvery beams; now glaring fierce
In sanguine horror, as the Heavens were wrapt
In universal flame, and final Fate 655
Pass'd in dread pomp o'er all the expiring orbs:
Then tranquil all at once, of softest hue,
The sky new prospects yields; gaily serene
With the mild tint of pleasant Green indued,

Or the pale gleam of modest violet :
 Now gliding, rushing now with rapid wing ;
 Then stealing with soft track beneath the veil
 Of the pellucid atmosphere ; and, mild,
 Mixing the blush of morn with purest white :
 Then, in the semblance of a fiery host, 665
 Fierce contest mingles in the azure vault,
 Astonishing the sight with countless forms,
 Horrid and strange : then vanishing at once—
 Darkling ; then breaking full with instant day
 The hills start forth, unbounded æther bursts
 Upon the view ; the distant vales emerge ;
 And terror, mingled with divine delight,
 Seizes the soul : such is the Heaven which rests
 Upon their gelid Zone ! Such as the seat,
 O EPICURUS, of thy fabled gods ! 675
 Invested ever with a cloudless sky,
 Glistening with clearer stars, and purer light ;
 Unvex'd by thunder, undisturb'd by rains.
 In the extreme of their severest cold,
 Their hospitable subterraneous huts
 Defy the Winter, and, secure, behold
 The fetter'd rivers, and the sea in ice ;
 Till, with the Sun restor'd, at once the Spring
 In height of beauty issues : instant Green
 Invests the meads ; innumerable flowers 685
 Of every hue rise as by magic power ;
 And all the horrors of the wintry scene,
 Dissolv'd at once, convert to Nature's pride :
 The gentle breezes fan the Earth reviv'd,

And

And infant leaves blossom ; and sudden fruit,
 In scorn of scarce departed Winter, pour
 Their prompt abundance o'er the smiling plains.
 The seas are open'd, and the long-wish'd Sun
 Dwells with delight upon the land, exil'd
 So many months ; their sufferings he repays 695
 With full return ; and temperate his beams,
 Friendly to harvest, if not favouring
 The warm luxuriance of the jocund vine :
 Rare is disease, chearful and long their age,
 But near the *Southern* axis of the World
 The unwieldy mass of *Ocean*, petrified,
 Deadens the Zone : by more than *twelve* degrees
 The chillness towards the Southern Pole exceeds
 The horrors of the *Arctic* ice ; and those,
 Who live but *thirty* from the Northern *Bear*, 705
 Feel milder season, than the habitants
Forty degrees from the South Pole, remote.
 Witness the Swedish realms ; and, Russia, thine,
 Near the great city of the CZAR renown'd ;
 Whose throne to grace with heighten'd dignity,
 For thee, O awful CATHERINE, was reserv'd.
 Witness these regions ; Witness e'en thy Bay,
 O HUDSON *, honour'd and regretted name !
 With the vast howling sea compar'd, which girds
 At greater distance from the Southern Pole, 715
 By *ten* degrees the wild inclement world :
 Where scarce the Cape of HORN presents to view
 A solitary point of land amidst

* V. note.

The endless waters. In the same degree,
 From the Equator on our side, the Tweed
 Flows blythsome, and the Western isles, which cling
 To Britain's side, rejoice; and to the South,
 Instead of land or navigable sea,
 The adamantine and eternal mass
 Of ice imprisons Nature. Yet, alas, 725
 Mourn we so large a portion of the globe,
 To human habitation thus denied,
 And Commerce? Fraud and Violence have room
 Ample already! Why desire to add
 New provinces to human wretchedness?
 While horrid War, and Vice, and Servitude
 Deform our world, accuse we Providence
 Of the contracted space, and ask for more?
 Even as distant from the Southern Pole,
 As fertile France, or the rich plains of Greece 735
 Are from the Northern axle, land but rare
 Extending towards the Magellanic Streight
 Appears, with chill and rude inhabitants;
 Even so near the Line, as where the Sun
 Beyond Gibraltar rends the parching soil
 Of Fez, and fires the Algerine domain,
 As near the Line upon the side oppos'd,
 The Caffre feels an heat, far less adust,
 Sooth'd by the breezes of the mighty deep:
 For not in vain the immeasurable sea 745
 Stretches; nor useless o'er the Polar ice
 Refrigerating gales fleet round the globe.

Nor other aid there fails to mitigate
The ardors of the *torrid* Zone. Behold,
Where *Taurus* proudly rears his shadowy height,
And from his locks the melting snow descends :
Behold, where, fierce from the Rhiphœan cave,
Boreas forth rushes, scourging woods and rocks,
Driving the clouds before him : Caucasus,
And towering Cassius, heaven-invading height, 755
See how he strikes with the resounding wing
Their summit; and, condensing, gathers storms,
And bears accumulated rains to soothe
The thirsty *Æthiopia* : thousand rills
Of sudden birth pour on the sultry soil :
Whom Nile in his capacious bed received
In full profusion to the Lybian land
Imparts the treasur'd store, tempering her heat
With tributary streams from half the world :
And ever as the air is more inflam'd, 765
And by the solar ardors rarefied
From the more dense and *frigid* atmosphere,
The incumbent vapours rush to lighter air,
And, ill sustain'd by its diminish'd weight,
Verge to the Earth, and fall in copious shower :
And thus the equilibrium is maintain'd ;
And thus discordant contrarieties
Subside harmonious in the golden mean ;
Such the sweet concert of great Nature's law :
And thus Taprobane beneath the ray 775
Of Sol direct ; thus the Brazilian fields
Flourish, exulting in the gay delight

OF

Of happy zephyrs and *eternal Spring*;
 Wild grows, unasking the assistant hand,
 The fair Hesperian fruit in golden pride;
 Native Perfume breathes through the balmy air;
 Flowrets of every lovely, varied die,
 And birds of richest hue, whose lineaments
 Own all the elegance of Nature's hand,
 Transport the eye. A Paradise confess'd!
 The happy land excels poetic praise.

785

Now let us follow, as the *Seasons* mark,
 Round the bright *Zodiac*: with attention due,
 Observing first, how happily inclin'd
 To the *Ecliptic* the progressive Earth
 Adapts her sphere to give vicissitude
 Of *Spring* and *Autumn*, and, in annual change,
Winter and *Summer* to her various tribes:
 For, if the axle of revolving Earth
 Were to her orbit *parallel*, the year
 Would only know one Season; and, profuse
 In promise, render but imperfect fruits.
 On the *Equator*, ye, who would observe
 The Seasons of our Earth, suppose us plac'd
 In the mid hour of night, when *Aries*
 Leads the renewing year; the starry orbs
 Shine o'er our heads; in the Horizon rest
 The Poles of Heaven; the Southern to the *right*,
 And to the *left* the Northern. O'er my head
 Direct the *Equinoctial* line presents
 The point, where the *Ecliptic* coincides

795

805

With

With the *Equator*; and beneath my feet
 The Sun to my *Antipodes*, on high
 Shines *vertical* in his *meridian* orb:
 And Night, through all the world, equals the day;
 For perpendicular the solar beam
 Bisepts the *Axle* of the Earth, and leaves
 An equal interval from either Pole;
 While, in the polar point, his *flaming sphere*
 Beams in the Horizon: for the day complete, 815
 Striking with level wheel the marge of Earth.
 The next day our *ecliptic* path declines
 Insensibly, and leaves, by *subtile stealth*,
 The *equatoreal* line. Thus more and more,
 Each added day, the Sun obliquely shines,
 And on the *left* the nights decrease: for soon
 The inclin'd axle catches on the side
 The solar ray, and slow the Eve comes on:
 While on the *right* the hemisphere retir'd,
 Slow wins the oblique beam, and soon resigns, 825
 Hence, therefore, *Spring* opens the early buds;
 Awakes the flowers, and cheers the languid soil:
 There *Autumn* presses the retreating sap,
 Strips the fair foliage, and spreads wide on Earth
 The ripen'd fruit: his reign in *Capricorn*
 He holds; while *Spring* rules in the sign oppos'd.
 Three months and the *solstitial* point is gain'd,
 Of greatest declination to the North;
 And to thy tropic, *Cancer*, shines the Sun,
 Vertical o'er the habitants of the Earth, 835
 Upon the correspondent circle plac'd.

L

Longest

Longest the day, and not a shadow falls
 From the thick grove or mountains: this the hour
 Of *Summer Solstice* to the Northern world;
 But *Winter* to the Southern hemisphere.
 Three months, and we attain the autumnal point
 Of *equinoctial Libra*, opposite
 To whence our progress we began; and still
 The Pole its equal inclination keeps:
 But now again the *equatorial plane* 845
 With the *Ecliptic* in this point concurs;
 The Declination is no more: next day
 The Sun again declines insensibly
 Southward, and *Winter* gains upon our clime,
 Till the full wintry Solstice mark the point
 Of utmost Declination to the South:
 Thence to the *Node of Equinox* ascends
 The Sun, till *Aries* recommence the year,
 And to our Hemisphere the *Spring* returns,
 Compensating our lengthen'd nights of Cold, 855
 And the brief gleaming of the languid day:
 While *Autumn*, on the Southern hemisphere,
 Spreads rich abundance, sees his vineyards glow,
 And views the treasur'd harvest with delight.

Ere we desert the planetary road,
 One point remains: familiar, but of use
 And highest import. See we not, oblique,
 The wintry Sun how much enlarg'd to view:
 Vicinity the cause; for now more near
 He shines on the attracted Earth, whose Path, 865
 A seeming

A seeming Circle round his central orb,
Is an Ellipse in truth : her wintry car
Above a *thousand times two thousand* miles
More neighbour to the flaming source of heat,
Than when direct she meets the solar ray ;
More full and potent with collective rays
In ardent summer : while the total space,
Which marks her nearest to the genial beam,
So small compar'd with the great line which bounds
Her measur'd distance from the golden Sun, 875
Vanishes, all insensible and lost :
Except that hence encreased velocity,
And lessen'd orbit to the Sun approach'd,
Contracts the wintry half of her career :
Less by eight days the period of her course
Through half her orbit, which the *Winter* claims
With youthful *Spring*, successor to her reign,
Than that which glowing *Summer* calls his own,
Leading rich *Autumn* crown'd with fruit mature.
Alike the law which every Planet knows : 885
Of *each* the orbit is *elliptical* :
And thence the rapid swiftness they acquire
When nearest to the Sun, augments the effect
Of their *projectile* force ; forbidding thus
The power of Gravitation to absorb
Their petty globes in the great central sphere :
Hence they retire, when on the giddy verge
Of dissolution ; and, retiring, lose
Insensibly of their projectile speed ;
Till the impatience of their eager flight 895

Abating by degrees, they now confess
The attractive power superior; and return
Obedient to the gently ruling Sun.
Thus the wise temperament of balanc'd laws
Regulates each extreme; compensating
Excess of gravitation by increase
Of the centrifugal opposing force,
And the decrease of gravitating power
By the decline of the projective flight.
Thus each in turn prevail; and thus partakes 905
The orbit of their several influence;
While this would plunge the planet in the Sun,
This hurry it to everlasting night:
So, in well order'd monarchy, the power
Which tends to arbitrary rule, still finds
A check in the resistance it excites.
Nor that resistance ends in Anarchy,
Breaking the system of fair government;
But, temperate and self-control'd, proceeds,
And its just aim completely gain'd subsides: 915
Nor is Disorder known, or Servitude:
Such is the heavenly harmony which rules
Earth, and the planetary orbs which grace
Our system: such the sovereignty which bows
Reluctant worlds to all preserving law!
But a long progress we have trac'd, and now
'Tis time to rest a while the flying car.

END OF THE THIRD BOOK.

E U D O S I A.

B O O K IV.

THE FIXED STARS.

995 **N**OW of the RISE and SETTING of the STARS,
Fixt in the vault of Heaven, we sing: the cause
Why some appear slowly to rise, and some
Eager to hasten up the heavenly hill;
The Names and Figures by symbolic lore 5
Assign'd; their fixt Relation to our Earth;
The Station, Rank, Number, and Magnitude;
Distance and Order of the starry Host.

915 Threefold the way a Star is said to rise:
For, when immers'd within the solar ray,
He sinks invisible; and when again
Bright he emerges from the splendid beam:
This we describe distinguish'd by the term
Adapted, and his re-appearance name
The rise *Poetic* or *Heliacal*. 15
When with the Sun, at equal time, a Star
Rises, we call this rising *Cosmical*:
And when it rises with the Eve's approach,
This rise is call'd *Achronical* by Greece.
Not to all places rise or set the Stars

At

At once; each parallel of Earth and Heaven,
 In perfect correspondence harmoniz'd,
 Owns the relation of the scite of Stars
 Above, to cities and to realms beneath :
 And different hours of rise observes each sphere 35
 To different places upon this our globe.
 On the *Equator* those who live, throughout
 The bounds of the GREAT CIRCLE see them rise
 To all at the same hour, and set to all
 Equal: each constellation they behold,
 Which gilds the bounds of either hemisphere.
 Those who behold the Northern axis rise,
 Obliquely elevated, see the Stars
Unsetting in that Pole's vicinity,
 And, as more distant from the Pole, more slow 35
 The constellations rise; or lie conceal'd,
Viequies for ever, in the Southern Heavens :
 While to the Southern skies glitter, unknown,
 The radiant honours of our Northern Pole.
 Those, who observe the Heavens, regard the rise
 Of Constellations more than single Stars ;
 Whether at morning or by night they leave
 The horizontal verge, and mount the Heavens.
 The *Right Ascension* of a Star, we count
 By the degrees computed from the *Ram*, 45
 Which come to the meridian with the Star.
 Oblique Ascension marks the point which comes
 To the horizon on the Eastern side,
 Computing on the Equinoctial line,
 When the Star rises to our hemisphere.

35 *Aries*, and *Taurus*, and the radiant *Twins*,
 The *Goat*, *Aquarius*, and the *Fishes* mount
 Oblique; the *Crab*, the *Lion*, and the *Sign*
 Which bears the *Virgin* form, *Libra*, and thou,
 Terrific *Scorpio*, with the *Archer*, rise 55
 Direct. It now is left to speak the names
 And station of the Stars; and to recount
 Those, which to Britain ne'er are seen to set,
 And those, which latent near the Pole oppos'd,
 She never views, the pride of *other* Heavens.

35 Thee, *CHIRON* *, shall I deem first to have taught
 The Names and Order of the Stars: or thee,
 Illustrious Father, by whose faith was left
 45 *Ur* of Chaldaea for the promis'd land?
 But whosoe'er deserves the fame, the work 65
 Enlightens every age: nor common praise
 On thee should wait, by whom the mimic spheres
 Were first design'd, model of Earth and Heaven.
 Such the transparent wonder from thy hand,
 Divine old Man *! whom Syracuse too soon
 Suffer'd to sink, forgotten; though her walls
 Thy wisdom long protected; and thy works
 45 Shall be her glory through all times to come,
 While more obscure than thy mean sepulchre,
 The stately city, boast of antient days, 75
 Loses the vestige of her ruins, sunk
 By desolating age, whose iron sway
 Genius and Virtue only can survive.

* V. note.

Beside

Beside the *Signs*, nineteen conspicuous forms
 Blazon our Hemisphere: the lesser *Bear*
 Leads from the Pole the *lucid Band*: the Stars;
 Which form this constellation, faintly shine
 Twice twelve in number; only one beams forth,
 Conspicuous, in high splendor, nam'd by Greece
 The *Cynosyre*; by us the *Polar Star*; 85
 Not three degrees of distance from the Pole.
 The *Serpent* next winds like a mighty stream:
 Within his ample folds are fifty Stars;
 One of the *second* order: far he waves
 His ample Spires, involving either *Bear*.
 Next the *Camelopard*, whose varied skin
 Fifty-eight Stars adorn; but none of these
 Pre-eminent in lustre: faintly gleam
 Nine, only to the *telescopic eye*.
 Follows the *Lynx*, who tramples on the *Crab*: 95
 Forty-two Stars this constellation claims,
 But glimmers with a weak and feeble light.
 Nor thee, *Cassiopea*, may we pass,
 Whose modest countenance is scarce beheld,
 When the Moon walks in brightness: wide her Stars
 Dispers'd, not shine with mutual aid improv'd;
 Nor dazzle, brilliant with contiguous flame:
 Their number *fifty-six*. *Cepheus* illumines
 The neighbouring heaven, still faithful to his queen,
 With *thirty-five* faint luminaries mark'd; 105
 And *three* of these are *telescopic Stars*.
 The *Helice* revolves around the Pole,
 Within the *Arctic* circle still confin'd,

And

Book IV. EUDOSIA.

89

And numbers *eighty seven* component Stars.
All these the Briton through the night beholds,
Exempt from setting all the circling year.

Now those, EUDOSIA, we pursue, which night
Partly reveals, and partly lends their rays,
To lighten on the adverse Hemisphere.

The *Goathead* with his *kids* the first: he shines 115
With *seventy* Stars, deducting only *two*;

Of which *Capella* never sets to us,
And scarce a Star of equal radiance beams
Upon the Earth: *two* other Stars are seen

Due to the *second* order. *Perseus* next
Brandishes high in Heaven his sword of flame,
And holds triumphant the dire Gorgon Head,
Flashing with fiery snakes: the Stars he counts
Are *sixty-seven*: and *two* of these he boasts,

Nobly refulgent in the *second* rank; 125
One in his Vest, one in *Medusa's* Head.

Near is *Andromeda*; in captive state
Lovely, majestic: *sixty-four* the Stars
Which grace her constellation: three are seen
Illustrious in the *second* class; and one
Of these ne'er sinks beneath the British wave.
And near in view the *Fishes* glide. But thee,
How shall I celebrate, O *Pegasus*!

Beneath whose foot the Heliconian mount
Smitten, gave way: forth rush'd the mighty stream
Of fabled inspiration: *ninety-three* 136

M

Thy

Thy band of Stars composes : *four* adorn
 The *second* order, and of these chief
 Beams in the ardent wing : *five* hid retire,
 To telescopic search alone reveal'd.
 The *Lizard* with an humble light appears,
 And *sixteen* Stars trace her contracted form ;
 Of which the lower only know to set :
 Haply this creature human Gratitude
 Rais'd to the sky : said to forewarn the bite 145
 Of venom'd serpents, and the signal give,
 Prescient, *Vesuvius* ! of thy gathering flames.
 But to the left, more neighbouring on the East,
 Thee, silver *Swan*, who silent can o'erpass ?
 An *hundred* with *seven* radiant Stars compose
 Thy graceful form ; amid the lucid stream
 Of the fair *Milky Way* distinguish'd ; *one*
 Adorns the *second* order, where she cuts
 The waves that follow in her utmost track :
 This never hides its fire throughout the night, 155
 And of the rest, the more conspicuous mark
 Her snowy pennons and refulgent neck.
 Then *Lyra*, for the brightness of her Stars
 More than their number, eminent ; thrice *seven*
 She counts, and *one* of these illuminates
 The Heavens far round, blazing imperial
 In the *first* order. To whose honour'd name
 Shall I inscribe the Star rather than thine,
 Harmonic KEPLER ! skill'd to trace, with art
 Divine, the latent music of the spheres : 165
 See in how apt vicinity the Heavens,

Music,

Music, and sacred Poetry, receive
 Your kindred constellations: here the steed
 Of fiery wing, who bears the bard on high,
 Glancing Imagination's boundless realm,
 And ranging Earth and Heaven: while beams beside
 Apollo's *Swan*; emblem of modest grace,
 Of unaffected dignity and ease,
 Of pure and elegant simplicity*.
 145 Close by, the *Lyre*, with heavenly strings, resounds
 The mystic harmony; and doubt we yet 176
 To raise the powers of Poetry and Song
 To Heaven, their origin and proper seat?
 Thus MILTON soar'd thy wing beyond the Stars'
 Creation, and old Chaos view'd thy flight,
 Passing their utmost limits: thus sublime,
 In the pure empyreum, thou beheldst
 Matter and Time yok'd to the golden chain,
 Which, from GOD's throne, supports the *Universe*!
 155 Now our returning circle in itself 185
 Revolves, and *Hercules* again appears;
 And, near to *Helice*, effulgent rays
 Beam, *Ariadne*, from thy starry crown;
 Twenty-and-one her Stars; but *eight* alone
 Conspicuous: *one* doubtful or to claim
 The *second* order, or accept the *third*.
Bootes follows with redundant light;
 Fifty-one Stars he boasts: *one* guards the *Bear*,
 Thence called *Arcturus*, of resplendent front,

* V. note.

The pride of the *first* order: *eight* are veil'd, 195
Invisible, to the unaided eye.

Next the *two Dogs*: *Asterion* one is hight,
The other *Phaethusa* we may name:
United in the starry path they range,
And *forty-five* their complement of Stars:
Three only by the Telescope discern'd.
Chief, in the radiant train, *one* bears thy name,
Ill-fated CHARLES! illustrious monument,
How, with inevitable stroke, when Pride
Turns from the sacred duties of the throne, 205
Transgressing law or violating right,
Indignant *Themis* smites the head of kings!
Nor to the People less a monument
On how precarious tenure Liberty
Is held; on how abrupt a precipice
Their happiness and safety trembling stands;
When, though the tyrant in the dust is laid,
Tyranny's root is suffer'd to survive:
And civil blood how vainly spent by those,
Who bleed to change a master! Now behold 215
The glittering maze of *Berenice's Hair*;
Forty the Stars; but such as seem to kiss
The *flowing tresses* with a lambent fire:
Four to the Telescope alone are seen.
The *smaller Lion* now succeeds; a cohort
Of *fifty* lucid Stars attend his steps;
And *three*, to fight unarm'd, invisible.
Next the free *Colt* tosses his youthful mane,

And

And shows *ten* Stars. Thee, near him I behold,
 On the marge dancing of the heavenly sea, 225
Arion's friend; *eighteen* thy Stars appear;
One telescopic. *Aquila*, the next,
 Divides the ether with her ardent wing:
 Beneath the *Swan*, nor far from *Pegasus*;
Poetic Eagle. Here might well be seen
 Thy name, O HOMER! thine, great SHAKESPEARE,
 writ

In *starry* characters! SHAKESPEARE, whose eye
 With eagle intuition pierc'd the maze
 Of moral Nature; gave to airy being 205
 A local habitation and a name; 235
 The unresisted master of the heart,
 Whether, in Terror cloath'd, he shake our soul,
 Strike dumb the guilty, and appal the free;
 Shew Vice her proper feature, and present
 All lovely Virtue in her heavenly form;
 Or tune the melting chords of sympathy,
 And wake, with magic touch, the tender sense
 To sweet vibrations of unutter'd joy:
 Or with creative energy call forth
 Ideal characters, and worlds his own: 245
Seventeen the Stars of splendid *Aquila*;
One dubious whether of the *second* rank,
 Or to the *first* entitled; but whose claim
 Seems to deserve the *first*. Near in the Heavens,
 Behold, where Honour, just to modern deeds,
 Points with delight the *Sobieskian Shield*:
Seven are its Stars; modest as may become

Those

Those to deserve more fond than to appear.
 Thee, *Serpentarius*, we behold distinct,
 With *seventy-four* refulgent Stars : and *one* 255
 Graces thy helmet of the *second* class :
 The *Serpent* in thy hand grasp'd winds his spire
 Immense ; fewer by *ten* his figure trace :
 One of the *second* rank ; *ten* shun the fight ;
 And *seven* he, who bears the monster, hides.
 See the Triangle of such various use
 In Astronomic art : *ten* only stars,
 And *four* of these are latent, mark its form
 Near fierce *Medusa*. With the auspices
 Of the fair constellation, we proceed 265
 To view the Stars of the *Antarctic* Pole.

Now sing, *URANIA*, the bright Southern train.
 Near the Equator first appears the *Ily*,
 Galling the back of *Aries* ; *four* faint Stars
 Are his whole number. Next beneath, the Whale
 Enormous, spouting forth thy mighty flood,
 Boundless *Eridanus*, shews to the sky
Seventy-eight Stars ; *two* of the *second* class.
 Look to the glories of the Southern crown
 With *twelve* fair Stars ; and near the altar stands, 275
 And fulgurates with nine resplendent spheres ;
 And, by the border of the milky stream,
 The *Wolf*, with *nineteen* luminaries mark'd.
 Next comes the second *Centaur* plac'd between
Scorpio and *Libra*, underneath their rays,
Thirteen his Stars ; above his head the *Crow*
 Glitters

Glitters with *ten*, striving to slake her thirst
 From the Bowl, lucid with *eleven* Stars :
 Near which, URANIA, beautifully bright,
 Thy *Sextant*, shines, with forty Stars adorn'd ; 285
 And *one*, but latent. Near the Equator rolls
 The sparkling *Hydra*, proudly imminent
 To drink the *Galaxy's* refulgent sea ;
 Nearly a *fourth* of the encircling curve,
 Which girds the Ecliptic, his vast folds involve ;
 Yet *ten* the number of his Stars, diffus'd
 O'er the long track of his enormous spires :
 Chief beams his Heart, sure of the *second* rank,
 But emulous to gain the *first*. O whither,
 Whither does thy effulgence seize me now, 295
Canicula! *fifteen* thy Stars ; but far
 Above them all, illustrious through the skies,
 Beams *Procyon* ; justly by Greece thus call'd
 The bright *Forerunner* of the *greater Dog* :
 Of the *fifteen* one is a latent Star.
 Next shines the *Dog* with *thirty-two* distinct ;
 Fam'd for pre-eminence in envied song,
 Theme of HOMERIC and VIRGILIAN lays :
 His fierce mouth flames with dreaded *Sirius* ;
 Three of his Stars retire with feeble beam. 305
 The *Unicorn* succeeds, with *nineteen* Stars ;
 But not the half conspicuous. Whom, O whom,
 Behold we now ? The fierce *Orion* glares !
 Him who admires not, to the Stars is blind :
 His radiant lights are *eighty* : first in rank
 The *martial Star* upon his shoulder flames :

A rival

A *rival Star* illuminates his foot;
 And on his girdle beams a luminary
 Which, in vicinity of other Stars,
 Might claim the proudest honours. Near it shines
 A Star of loveliest brilliancy, which shames 316
 The Topaze and the Diamond: and beneath
 The timid *Hare*, claims with the *Unicorn*
 An equal number of inferior light.
 And near, of Love and tranquil Peace the sign,
 The beauteous *Dove*: of safety harbinger,
 When in thy ark, O NOAH! were contain'd
 Eight lives, relique and hope of human kind!
 Ten Stars she bears; of *second order one*.
 And next the *Ship*, *Argo* her Grecian name; 323
 But haply meant the symbol of the ark;
 Her Prow not forward to the starry way,
 But adverse: such as when the Port is gain'd:
 Perhaps because Safety and Peace secur'd,
 Advanc'd her to the Stars; destin'd to trace
 No second voyage: *twenty-five* her Stars;
 Those, which compose the lucid *Keel*, to us
 Unseen, sink never in the Southern sky.
Eridanus, the river of the gods,
 Supreme in fabled lore, with *seventy* Stars, 335
 Except *two*, radiates; but *one* of these
 Only to telescopic eyes is seen.
 Next beams the *Phenix*, of unfading life
 Rais'd from our ashes the blest symbol: see
 Thirteen the Stars she offers to the view;
 One lovely in the *second* rank behold.

Now look where, patient of the length of way,
The *Crane* appears; *thirteen* her Stars: of these
Her head *one* graces; *one* beneath her breast
Shines; and each wing no common light adorns. 345
The regal *Indian* is the next beheld,
Pointing his arrow: sure that form is thine,
O GUATAMAZIN! whom the Mexique realms
Admir'd, the assertor of their liberties,
And Freedom bore thy standard; though in vain
Against Injustice gloriously oppos'd:
Twelve Stars are thine. Look where the *Peacock*
spreads

His lightning train; *thirteen* the Stars which fill
The beauteous constellation; *one* of these
Deserves the *second* order. Next appears 355
The bright *Triangle* of the Southern Pole;
Five are its Stars; of the *first* order *one*.
The *Cross* sign of *Redemption* now appears,
Relucent with *four* Stars: and, bordering high
Upon the Polar circle of the South,
The British oak a witness stands how shine
The honours of her navy o'er the Earth,
And how her Virtue triumphs in all lands,
Acquires new worlds, and mounts to Stars unknown:
Twelve are its Stars: of *second* radiance *one*. 365
The *Sword Fish* see at hand, mark'd with *eight* Stars,
Obscure, and of no memorable light.
The *Water Snake* *ten* Stars reveals to view;
Nor splendid; nor of signal magnitude.
The *Indian Bird* next rises into day

N

With

With *nine* Stars spotted: and entire within
 The Polar Circle, with *eleven* gay lights,
 The *Bird of Paradise*: and next the *Bee*
 Obtains, by generous industry deserv'd,
 Her radiant place; her Stars are only *four*. 375
 Last the *Chameleon*: emblem of the wife,
 To every change of fickle fortune prompt,
 To suit his pliant, but corruptless mind,
 Nor stoop to flattery or calumny;
 Reserv'd, but honest; not inflexible,
 Yet constant to the right, and still the same.
 This constellation ends the starry train,
 The *Cynosura* of the Southern Pole:
 Though *twelve* degrees from thence the nearest Star.

Nor ye fair constellations let me pass, 385
 Whom, faithful to her sister sciences,
 ASTRONOMY hath nam'd: the instrument
 Which gives the tablet to the painter's view
 Aptly display'd; the measurer of Time,
 Whose artificial movements point the hour;
 The fam'd *pneumatic Engine* *, proud to boast
 The parent names of GUERICKE and of BOYLE:
 And thou, great medium of intelligence,
 The *typographic Press* *! diffus'd from whom
 The pure NEWTONIAN splendour fills the Earth; 395
 Science is fixed; and free Philosophy
 Conveys her blessings to unnumber'd hands.
 Nor thou, O *Microscope* *! whose oracle

* V. note.

Reveals the wonders of minutest worlds,
 Hast ill deserv'd thy place : but who from thee,
 Illustrious *Galilean Tube* * ! shall wrest
 Thy radiant honours ? By whose aid are seen
 The planetary Phases, the bright cohort
 Of secondary Worlds, and countless Suns,
 Which, hid in the immensity of Space,
 Ne'er visited the sight : from whom we learn
 The Eclipse in time and quantity exact ;
 And trace the Parallax, that wondrous clue,
 By which the distance and the magnitude
 Of the celestial Spheres is known to Earth.

Nine hundred Stars, and still a few beyond,
 The *Zodiac* comprehends.—

The total host,

Seen by the unaided eye or telescope,
 Exceeds *three thousand* and *two hundred* Stars ;
 Of which a *thousand* rarely to the eye
 Appear at once, though numberless they seem :
 So much their dazzling beams, the awful vault
 In which they shine, the multiplying power
 Of rich confusion, on the sense prevails ;
 As, to compare greatest with small, the eye
 Which looks on Salisbury's amazing plain,
 And sees, by the pale glimmering of the moon,
 Stupendous masses whitening o'er the dusk,
 The giant columns of our fathers' pride,
 To number them deems it an endless task,

* V. note.

N 2

Though

Though not their multitude, but curious range
In regular disorder, thus seduce
The fancy to account them infinite.

If wonder strike the soul how all these worlds,
So vast, and cloath'd with universal light,
Should give their several image to the eye,
And not in vast luxuriance pour *one* blaze
Confus'd, unbounded on the fainting sight,
Contemplate how immense their distances,
Dividing each from other : and how fine 435
The particles of light : whose myriad beams,
Darting incessant with unutter'd speed,
Wound not the tender eye ; whose subtile sense
The smallest grain torments, the finest down,
Or e'en the airy gossamour, offends.
Think how the separate image is convey'd
From many lamps through the least aperture ;
While the repulsive rays, from each deriv'd,
Observe their proper path ; nor ought disturbs
Their several passage through the narrow space, 445
Which but a single grain of sand would choak *.
Think, in the splendid dome, to pleasure vow'd,
Where elegant magnificence allures
The inconstant taste with ever varied scenes,
How thousand lustres, artfully arrang'd,
Vibrate with social ray ; yet each distinct ;
Except where highest glow, with blended beam,
The *mimic* Stars, a beauteous *Galaxy* :

* V. note.

Or, rapt in fancy to some neighbouring space,
 Above the Earth, behold the fatal brand 455
 Of CONFLAGRATION from indignant Heaven,
 Devouring distant cities in one hour.
 Here blazes the great capital of Spain!
 There Tyber reddens; and the Italian sea
 Flames with the fiery wreck of awful Rome!
 While Hellespont, and the wide Euxine gulph,
 Reflect dire lustre from thy burning towers,
 City of Constantine! while Ruin glares
 Triumphant o'er the Czar's imperial seat;
 The pride of Paris; and, O Britain, thine! 465
 And fierce Vesuvius swallows Sicily
 In one vast torrent of resistless fire;
 And Hecla, bursting through the world of ice,
 Flashes infernal lightnings! Could an eye,
 Secure from peril, nor alarm'd with dread,
 Or lost in pity, view our hemisphere
 At such a time, when isles and continents
 Yield up their tower-crown'd honours to the flame,
 Ere yet the fiery flood deluge the globe,
 Then might he judge, comparing small to great, 475
 How Planets are beheld, and distant Suns
 Distinct.—In human works rarely the *vast*
 Escapes Confusion; and Obscurity
 Frustrates the *labour'd* Elegance which hopes
 To give perfection to *minute* design:
 But, in the Majesty of Nature's works,
 The unimagin'd *small*, the immensely *great*,
 Unite in *specious* Harmony: throughout,
 Finish'd Perfection, Beauty, Goodness reign.

Now

Now let us watch the RISING of the Stars: 485
 And look where *mid* December points the hour
 Most apt for contemplation of the scene.
 The *fourth* from noon is pass'd, and half the space
 Fled to the *fifth*: in the meridian view
Cepheus, sublime; the *Dragon's* tortile spire,
 Where shines to Britain's great metropolis,
 The *correspondent* Star; alike remote
 This from the *heavenly*, that the *earthly* Pole,
 And perfectly coincident in place.
 The *greater Bear* is seen; and *Pegasus* 495
 Tends to the South; the beauteous *Twins* emerge
 From the Horizon; *Taurus* climes oblique;
 Still higher *Aries*; the declining *Fish*
 Verge to the Southern wave; and *Capricorn*
 Glistens, diminish'd in the Western sky:
 And, near the goal, with languid ray appears
Chiron; but, nigh to the direct of East,
Orion half is risen: nor prevails
 The Horizon even now to eclipse the pomp
 Of the proud constellation; his right side 505
 Blazes; the Star, which lightens on the left,
 Is winning now upon our hemisphere:
 And near him the vast *Whale* conspicuous shines.
 The *sixth* hour is elaps'd, *Orion* shews
 His flaming Belt; the *Twins* are wholly risen;
 Soon *Procyon* appears; and now the *Crown*
 Of *Ariadne* rises: CHARLES, thy Star,
 Though never setting to the Horizon, stoops.
 And of the *Crab* the far distinguish'd light
 Emerges.

Book IV. EUDOSIA.

103

Emerges. Little later than the *seventh*,
Sirius appears : the *ninth* the *Lion* shines ;
 And in the *vertex* is *Medusa* seen.

515

Near the *tenth* hour from noon *Hydra* appears
 Southward : at *mid* of night *Orion*'s form
 Fires the Meridian ; but the *Whale* retires ;
 The radiant *Lyra* meets the Horizon's bound ;
 The *Virgin* form shows her ascendant wing ;
Capella in the Zenith glows : an hour

Is past, *Arcturus* rises : ere the night
 Has mark'd the second hour from its mid space, 525
 Shoots in full beam the great NEWTONIAN Star.

The *fourth* approaches, when the golden Star
 Of *Libra* gains the eye : the Sails retire
 Of the resplendent *Ship* ; her lucid Mast
 Shines eminent. The *sixth* her fetter'd Arm
Andromeda discovers ; and the Heart
 Of *Scorpio* rises : *Hydra* fills the West ;
Medusa's Head sinks, and *Orion* bears
 With difficulty his shoulders unsubmerg'd :

Monoceros succeeds. Why should I name
 The *Snake* or *Serpentarius* fully risen ?

535

Or why repeat the wonders which before
 Engag'd our eye ? The great and smaller *Bear*,
 With the *Camelopard* and varied *Lynx* !

Or gaze on thee, O *Perseus* ! thee admire,
Aquila ; or the *Lyre*, which re-ascends ?

But, rising Eastward, beams the glorious arch
 Of the pure *Galaxy* ! And now appears
 URANIA'S Sextant, and persuades to leave

The

The starry theatre, and yield to dawn : 345
 For now *Aurora's* fiery coursers gild
 The frosty summit of the Eastern hills.
 All this delightful scene revolving Earth
 Produces, visiting the several Stars ;
 While undisturb'd remain the heavenly spheres.

For see when the bright Star, which marks the side
 Of the *Whale*, stands in the meridian height,
 With right ascension of twice nine degrees,
 The *Swan's Beak* to the Gulph of Mexico
 Shines vertical in West ; the lucid beam 555
 Which marks her wing, to the Canadian lake,
 Points the Meridian ; and the light, which notes
 Her form extreme, from the proud Zenith views
 New England's hardy sons ; *Cepheus*, thy side
 To Baffin's Bay beyond Davisian streights,
 North-westward of the Cape of Hope, observes
 Due correspondence : the full piercing ray,
 Which darts effulgent from the Southern *Fish*,
 Strikes vertical midst the Atlantic sea :
 While to the East *Andromeda* beholds 365
 The Corsic and Sardinian coast beneath
 Her lucid Foot : thy shoulder, *Persæus*,
 Direct o'er Lithuania beams, the mouth
 Of the *Whale* threatens o'er the Golden Coast
 Of Afric ; such the distance from her side
 Proportionate : the Pleiades behold
 The Nubian borders, and thy frontier stream,
 O Nile ! The foot of *Pollux* points the mines

Of rich *Golconda*, the imperial source
Of Asiatic gems : while *Procyon*,
From his Meridian, flashes on the coast
Of *Sumatra*. Thus the *Geography*

575

Of this our globe, illustriously mark'd,
Shines to the eye inform'd amid the Stars :
And thus the order of celestial spheres,
And their proportioned distances, we note
By the vast scale of mighty empires, spread
Upon the peopled surface of our Earth :

But how contracted when with Heaven compar'd !

More aptly may the smallest chart present

585

Earth's whole domain and all the vast of Sea,

Than our whole globe the smallest tract of Heaven.

Thus mark we *rise* of Sun or of the Stars

To every nation : and compare their days,

Their nightly shadows, and their varied year.

That not at the same hour revolving Earth
The same Stars to her different realms presents

Is easy to discern : but when a Star

In the same point, which astronomic leaves

For the bright station of the Sun assign,

595

Rises, how shall we satisfy the doubt,

Why still the Sun keeps back his lingering ray

Beneath the Horizon ? Observation proves

That the fix'd Stars insensibly appear

To gyrate with slow progress towards the East ;

So slow, that greater than *two thousand* years

The space requir'd to pass a single sign ;

O

And

And at that distance, where we look from Earth
 To *Taurus* now, the lucid *Ram* appear'd;
 And where the splendid *Twins* are now beheld, 605
 If Earth outlive *two thousand* years to come,
Taurus will be: nigh such the variance
 From thee, HIPPARCHUS, numberer of the Stars,
 To this our age: and hence CHRONOLOGY
 From *astronomic* Science borrows Light,
 And owns her truths confirm'd: hence we can trace
 From the Phænomena mark'd by his verse,
 HESIOD how early born, and judge from thence
 What time *exulting Poetry* beheld
 Her infant HOMER: and what ages back 615
 The first degree of *Aries* stood exact
 With the *Colure* of *Equinox*; a sign
 Which marks the *Argonautic* enterprize,
Two thousand and *seven hundred* years remote*.
 Thus *Time* not less obeys thy sovereignty,
 Than *Space*, divine URANIA! *History*
 No less than *Poetry* thy name revere.

Contemplating the *apparent* magnitudes
 Of the great starry orbs, new harmony
 Strikes on the ravish'd mind: so rise the train, 625
 Rank beyond Rank, proud Amphitheatre:
Fifteen the Stars which the *first* order claims,
 Thrice number'd by the *second*; thrice exceeds
 The *third* the number of the *second* class;
 The *fourth*, profuse in Stars, doubles the *third*:

* V. note.

The *fifth*, still rising, adds *two hundred* Stars ;
 Nor yet is satisfied, above the *fourth* :
 The *sixth* thrice counts the legions of the *fifth* :
 The *seventh* alone falls short in multitude
 Of its preceding rank : not that we hold 635
 Its *real* numbers less, but to the eye
 The distance infinite obscures the beams
 Which fill its ample circuit ; and what thought,
 What power of fancy shall decide how far
 The flaming ranks extend, or judge the bounds
 Of the vast UNIVERSE ! the Multitude,
 Distance, and Stations of its glorious Worlds !
 Mark where *Orion* blazes ; thither point,
 O studious of celestial miracles !
 Thy optic tube. Seest thou a splendid space 645
 Opening new Heavens to thy astonish'd view,
 And pouring Stars more numerous on the eye,
 Than the unaided sight may comprehend
 In all the hemisphere ; their distance judge,
 Since the same tube, however great its power
 To show the planetary spheres enlarg'd,
 Views even *Sirius* merely as a point
 Divested of the wandering rays, which mock
 Our sense, and paint him sparkling in a form
 More ample : but for this the aching sight 655
 Would fail to reach the nearest of the Stars ;
 But on this subject Fancy's self requires
 To rest her still impatient wing, and soar
 To such stupendous heights by gradual rise.

Nor does *Analogy*, daughter of Heaven,
 Whose change is uniform, whose simple laws,
 Midst endless variation of effects,
 Agree in Basis, to the Sun alone
 Enjoin Rotation: for the other fix'd
 Are found to whirl upon their lucid Poles: 665
 This, *periodic Disappearances*
 Of certain Stars, which after destin'd lapse
 Of time again illuminate our Night,
 Again to disappear, not weakly prove.
 Thus in the *Whale* a memorable Star
Seven times hath hid, and *seven* return'd his orb,
 To be admir'd by Earth: the Interval
 Of Darkness and of Light unchang'd, and one
Three hundred days constant to each assign'd.
 Another Star sagacious KIRCHER saw, 675
 Appearing and conceal'd by just returns,
 Exactly equal. The bright Stranger such,
 Who, in ELIZABETH's triumphant reign,
 Diffus'd new glories on thy beauteous form,
Cassiopeia! darting brilliancy
 Equal, O *Venus*! to thy lovely sphere.
 This Star is held to shine, and disappear,
 In the long period when volubile Earth
 Measures *three hundred* times her *annual* course*.

This Prodigy the astronomic Sage 685
 Refers to spots of darkness, permanent,
 Not fleeting; this excepted, such as veil

* V. note.

In less degree our Sun; and might entire
 Bury his fiery orb, if gracious Heaven
 Lent not the constant blessing to the Earth:
 And as the whirling axis to our sight
 Presents the darken'd surface, or restores
 The lucid point, the Star delights our eye,
 Or flies from our observing sight:
 And, if Rotation be allow'd the cause, 695
 Judge of the Distance or the Magnitude
 Of the revolving orb. The Star which beams,
 Gracing *Cassiopeia*, if it roll
 Each part of its circumference with flight,
 Equalling the same portion of the Suns,
 Must by an *hundred* times in magnitude
 Exceed the Sun: such haply in the Heavens
 Are *thousand* Orbs, the *imperial* Centres each
 Of many *solar* Systems: ONE perhaps,
 ONE ORB, stupendous beyond human thought, 705
 Is the *great Centre* of the UNIVERSE;
 Which else by Gravitation's power sustain'd,
 By the same power, unless the Almighty Will
 Should interpose, must gradually break
 The Independence of its several Parts,
 Dissolve the fair Connexion of the Whole;
 And thus disorder'd Worlds rushing on Worlds,
 System on System, in fierce Anarchy,
 The chain of Union and of Order burst,
 All into Chaos plunge annihilate. 715
 But these transcendent mysteries are known
 To thee, Eternal Sire! while human thought,
 Trem-

Trembling, conjectures : of thy Providence
Alike secure, whether one awful hour
Shall sink Creation, or Eternity
Behold thy glorious *Universe* maintain'd
By Harmony ! Sufficient that thy will
Gives to frail man the blissful hope of life
Never to terminate * ; whatever worlds,
New or existing, are his seat ordain'd.

725

* V. note.

END OF THE FOURTH BOOK.

IV.
E U D O S I A.

725
B O O K V.

ECLIPSES; PHASES OF THE PLANETS;
AND TIDES.

LIGHT AND COLOURS.

DESCENDING now from such o'erpowering
height,

Our system we revisit, to behold
The darken'd *Moon* and *Phæbus* in eclipse;
The varying forms of planetary Light;
The Ebb and Rising of the reflux Sea: 5
Here, O *URANIA*! give thy potent aid,
That my *EUDOSIA* may approve the song.

Hail, worthy of heroic praise, ye sons
Of *HERMES* and *ASTRONOMY*! above
Base fears and sordid hopes your spirits soar'd;
Above the pride of kings; above the power
Of captivating luxury; beyond
The realms of change and death: therefore, secure,
Your names defy oblivion; Glory waves
High in the Heavens the sacred roll, and shows 15
Your honour'd record from her car of fire,

T.

To the admiring Earth. Posterity
 Shall see, and reverence : the vulgar crew,
 Whose soul is riches or vile appetite,
 Whose life has been a despicable dream,
 How shall they lift their groveling thought to judge
 Your fame how pure, how exquisite your bliss :
 And how shall tyrants tremble to behold
 The peaceful benefactors of mankind,
 Happy and lov'd while living, and rever'd
 Beyond the grave ; heirs of Eternity !

Not Superstition, child of Ignorance,
 Who shrinks aghast before the DEITY,
 And sees his terrors where he most displays
 To the free mind his love, appal'd your souls :
 While others from the *Lightnings*' vivid flash,
 The awful *Thunder*, and the deep *Eclipse*,
 The *Tide*, the *Comet*, drew portentous signs,
 Ye heard the voice of GOD amid the storm
 Speak mercy ; ye beheld the thunderbolt,
 His messenger of good ; ye, in the rise
 And the subsiding of the mighty deep,
 Discern'd the laws of harmony and peace :
 And, in the dark *Eclipse*, with filial awe
 Trac'd the all-gracious Parent of the spheres ;
 Their distances and their proportion learnt ;
 Extended Navigation ; and secur'd
 The mariner through the tremendous waves :
 Ye, in the *Comet*'s dreadful train, beheld
 Extent unspeakably beyond the fears

Of Superstition's self; ye saw its range
 Through space to which our system is a point:
 But not affrighted saw. *Philosophy*,
 Who open'd to your eyes the immense career,
 Reveal'd the order, the all fair design,
 Which guards our Earth and her companion spheres
 From the fierce inroad of the threatening Star:
 While such the darkness o'er great empires spread,
 That mighty portions of the globe still shrink
 Before ideal prodigies: and once 55
 States, high in glory and for arts renown'd,
 Beheld their *Phæbus* darken'd, and to aid
 His orb against Enchantment's fancied power,
 Rais'd the loud cry, and in a mingled din
 Breath'd the shrill flute; clang'd the sonorous brass,
 And brought like succours to the labouring Moon;
 And Fleets and Armies have exchange'd the hour
 Of victory; and Generals, high in fame,
 Seen their fresh laurels wither'd by defeat,
 While the inestimable time was spent, 65
 Till the veil'd Moon or Sun in part conceal'd,
 By due lustration of inactive days,
 Lost in weak terror and in idle vow,
 Might grant them Expiation: such the dread
 Which blasted the Athenian majesty,
 When they beheld on the Sicilian coast
 The Moon eclips'd. This ignorance of Heaven
 Brought Macedonian PERSEUS to the fate
 Merited by his guilt: the Roman spear
 Had haply turn'd from glory, and forsook

P

75
Thy

The inviting arms of victory, o'er-aw'd
By a deceitful terror, had not then
SULPICIOUS, vers'd in astronomic lore,
Chear'd their desponding hearts by argument,
Such as the pride of Athens erst employ'd,
When to his fleet aghast at an Eclipse
He spread his mantle, with an easy smile,
Between his pilot and the Sun, and ask'd
Whether the prodigy daunted their minds?
Fear not, O favour'd of the Heavens! Shall ye, 83
Shall Romans, looking to the Moon when veil'd
By the extended shadow of the Earth,
Shall Romans tremble? Shall the times to come
Say that ye fled from victory and fame,
Struck by imaginary prodigies?
Rome and her Gods, and your own valour calls
To glory and sure conquest! Hear you not
Your Country's hallow'd voice? In her great cause
Ye fight; the first of omens to the brave:
The good and wise have Providence to aid; 95
Their fortune is secure above the Stars:
Justice, the sovereign of the Universe,
Wars against Tyranny and Fratricide:
Ye are her foldiers: to your enemies
This terror: go, ye generous sons of Mars!
Go, humble Macedon! She now eclipsed:
Beneath, the dastard PERSEUS, trembling, waits
Her final overthrow: PHILIP, who beam'd
Her setting empire's Sun, your valour sent,
Sporn of his rays, to everlasting night:

105
With

With the same gods, your cause, yourselves the same,
 And by EMILIUS led, what Roman doubts?
 Go, and by this day's conquest end the war,
 And triumph in the Macedonian spoils:
 And add her haughty state, the scourge of Greece,
 To the dominion of imperial Rome,
 He said, and ceas'd: defeated Macedon
 Confirm'd his word. From thence, with mind serene,
 The sons of ROMULUS beheld the Moon
 Beneath Earth's shade, nor trembled when the Sun
 Was hid by *Cynthia's* interposing sphere. 116
 Thee, THALES, first, learn'd in Egyptian lore,
 Greece celebrates, whose knowledge of the cause
 Inform'd thy lips to tell the appointed time,
 When the Earth's shadow, in protracted cone,
 Should hide the Moon: and, from that day to ours,
Two thousand and five hundred years have roll'd.
 Nor thee, ENDYMION of our later age,
 Sage Shepherd of the Northern Scotia's hill,
 Shall grateful memory forget: how blest, 125
 If to my verse the favouring Muse indulge,
 The happy clear expression which she gave
 Thy simple prose. O! teach me to express
 Familiar what the causes of ECLIPSE,
 Their difference, their limits, and their use:
 Since knowledge taught by thee, O FERGUSON!
 Seem'd intuition to the learner's ear.
 Thy parent Earth in infancy beheld
 Thee with untutor'd genius on the Stars
 Intent; above thy years, and far beyond

Thy humble lot: nor flowery mead, nor play,
 Nor sleep beguil'd thee from the beauteous scene:
 Nor poverty, nor health infirm, suppress'd
 The active vigour of thy mind: nor all
 That lowering Fortune interpos'd, eclips'd
 The piercing ray of thy superior soul,
 Heaven-taught Philosopher! Thy wandering sheep
 Saw thee, with eye sublime, reading the Heavens:
 Nor wanted they a guide; the good old man,
 Whom gratefully thy modest page rewards, 145
 To thy fidelity and genius just,
 Provided hours of leisure; that secure,
 Nor fearful for the charge, thy eager view
 Might range the firmament: ye woods, ye founts,
 Dear to the flock, and to the shepherd dear,
 He leaves you: for Philosophy invites,
 And leads him to pursue her path divine,
 Amid the busy haunts of men, in scenes
 Not well adapted to his gentle mind;
 But if thy vestige he may trace, and hold 155
 Sweet converse with thy favour'd sons, the din
 Of the tumultuous city more delights,
 Than rural peace and sacred solitude.
 Thus, whether in retirement or in crouds
 He liv'd; and thus within thy arms he dy'd,
 Thy son: and thou wilt shield him in the shade
 Of thy protecting amarantine wreath;
 And, though no monument rise to his name
 Of stately marble, to thy sacred band
 His memory shall live, more nobly shrin'd 165

Than

Than in the mouldering stone. Thy grateful tear,
 And thy example to his precepts true,
 Loveliest EUDOSIA, honour more his shade,
 And more delight, if ought of human act
 Reaches the dead, than all the pageantry
 That wealth and pride supply.—He of *Eclipse*
 Thus taught; nor new the lore—but, taught by him,
 Simplicity and clearness made it new.
 Whatever shines with a reflected light,
 Needs but a shadow of proportion'd size, 175
 Distance, and situation, to conceal
 Its borrow'd rays, veil'd by this means alike,
 As if a solid body interpos'd:
 But whatsoever shines with native beam,
 Subdues opposing shadow; nor is hid
 But by a solid intervening mass:
 Therefore the *Moon* needs not that any sphere
 Should move between to hide her from the Earth:
 For never would she suffer an *Eclipse*
 Were this requir'd—sufficient that the shade 185
 Of the revolving Earth falls on her orb.
 The shadow which a solid body gives,
 Is to its form, its magnitude adapt;
 The distance and proportion'd magnitude
 Of the illuminating orb. Our Globe
 Casts a long Cone of shadow in the Heavens;
 The proper form projected by a sphere,
 As erst URANIA taught, when she disclos'd
 The figure of the Earth on which we live:
 And geometric Reason, measuring 195
 The

The distance of the Moon, the Sun, the Earth,
 Evinces that the shadowy cone must fall
 Some space beyond the orbit of the Moon.
 But yet, as when the transit we observ'd
 Of splendid *Venus*, so the *lunar* path
 Casts the revolving shade oblique, which falls
 Not on the Moon direct, but when in *Node*
 She cuts the *ecliptic* points; or when remote
 From the Node nearest to the Earth, not more
 Than *twelve* degrees she journeys; or retires 205
 Not more than *ten* in *Apogee* oppos'd:
 These her *ascendant* and *descending* Node,
 Her *Southern* and her *Northern* Node are nam'd:
 But *retrograde* her Nodes in *nineteen* years
 Range the *Ecliptic*; wherefore not one part
 Of Heaven, nor months of corresponding Time,
 Give the *Eclipse*, till this full period
 Is measur'd: this the *Cycle* of the *Moon*,
 Since in this circle her *Eclipses* move.

Nor vary less in Quantity than Time, 215
 The *Obscurations* of the *Moon*; when full
 Her sphere receives upon the *central* Node
 The shadow, or, in close vicinity,
 The *Eclipse* is *total*: when on either side
 More distant from the center she admits
 The shadow, *partial* will be *that Eclipse*.

But, when the *Eclipse* is *total*, still the Moon
 Not *disappears*; but with a doubtful gleam,

Which

Which trembling Superstition fondly thought
Image of Blood, the atmosphere of Earth 225
Refracts the solar rays, and on the Moon
Casts the reflection of a sullied Red.

Equal degrees measure the quantity
Or of the Sun, or of the Moon's *Eclipse*;
But harder far to calculate the *Sun's*,
And far more varied the Phænomena.
Ampler the space on either side the *Node*
For solar *Obscuration*: at the mean
Nearly *seventeen* degrees: and when the *Moon*
Moves to her *Perigee* nearest to Earth, 235
And in the *Node* the line directly falls,
Cutting the center of *Earth*, *Moon*, and *Sun*,
Then *central* the *Eclipse*, and total shade
Dwells longest on the Sun's illustrious orb:
But in the lunar *Apogee* the shade,
Central not *total*, leaves a *lucid ring*
Round the Sun's disk, and that *Eclipse* obtains
The fit, expressive name of *Annular*.
At *seven* degrees of distance from the *Node*,
In the mean distance of the *Moon* from Earth, 245
Total, but for a moment the *Eclipse*:
So near the apparent magnitude of both
The *Moon* and *Sun* concur: the distance such
Adjusted to their real magnitudes:
Therefore *three* minutes, and a *fourth* beyond,
Limit the longest time allow'd the *Moon*
To hide entire the solar orb from sight.

The

The lunar *Obscuration* is beheld
 Equal o'er all the hemisphere which fronts
 Her orb; but small the portion of the Earth, 255
 Veil'd from the Sun by the interposing Moon,
 And therefore *ninety* miles *twice* measur'd form
 The line, that circle's just Diameter,
 Where the Moon covers Earth in total shade:
 But the *Penumbra*, or faint partial shade,
 Over the space of near *five thousand* miles,
 Computed in Diameter, may spread:
 And more or less, as from the center near
 Or distant, is the *Eclipse* within these bounds.
 Nor the Earth's *Axle* to the *Sun oblique* 265
 Slightly affects *Eclipses* of the Sun:
 For hence to places which would fall within
 The central shade, often a partial night
 Invades, and often to these points the *Eclipse*
 Is lost, *invisible*: nor is the time
 Not shorten'd by the Earth's *diurnal* wheel,
 And chiefly near the Poles: the utmost time,
 Which veils in central shade the lunar orb,
Four hours within *three* minutes comprehends.

Thus have we seen the cause, the fixt returns, 275
 The limits of *Eclipses*, which no more
 Alarm Philosophy; and, calm'd by her,
 The vulgar eye beholds them undisturb'd:
 But if a darkness of more awful kind
 History points, the philosophic Muse
 Reverses the sign: such the terrific gloom

Which

Which o'er Judæa hung, and wrapt in night
 The astonish'd nations when their Saviour dy'd.
 The Moon at full, and *three* tremendous hours,
 Night o'er the empire of mid day prevail'd; 285
 Earth trembled; the vast Temple's mystic veil
 Burst: Nature felt the one great sacrifice.
 O wretched Israel! see thy towers in dust,
 Thy race o'er every land scatter'd, preserv'd
 A monument of vengeance! Ask the Sun
 The cause which hid his beam? Return, return,
 Emerge from thy Eclipse of ages: rise,
 And re-assume thy glory: Piety,
 Virtue, and white-rob'd Peace expect their reign,
 Their destin'd reign, and summon thee to bliss! 295
 O then at length—but we at least receive
 URANIA's testimony; nor divorce
 Religion from thy truths, Philosophy.
 Proceed we now in our unfinish'd path.

When the *Eclipse* is *annular*, a *Rim*
 Of purest radiance crowns the utmost verge
 Of the Sun's disk: though haply less appears
 Than of his lucid orb the *fortieth* part,
 Such brightness fills the Heaven as well may teach
 How *Saturn* bears his absence from the Sun: 305
 Even in total darkness, when conceal'd
 The Sun retires, not therefore upon Earth
 Night spreads her wing, usurpant of the Day;
 But scarcely splendid *Venus* is beheld,
 And haply of prime magnitude a Star:

Q

Still

Still Day not abdicates his honour; still
 The grace of light prevails: for from the Sun
Eight minutes the progressive ray requires,
 With unimagin'd speed, to reach the Earth;
 As the *Eclipses* of thy radiant guards, 315
 O *Jupiter*! evince: therefore the Sun,
 Extinct, would send his rays for longer space,
 Than central darkness o'er his orb has power:
 But whether annular or total shade
 Cover his disk, beyond the central gloom
 Spreads an *elliptic* shadow, emulous
 Of the poetic *Aegis*, covering
 Nations and empires in its ample orb:
 And, bounding on the farthest marge, behold
 A radiant circle with thy brightest tints, 325
 O *Iris*! in delightful order glows.

Hence, emulous, the philosophic mind
 Explores the cause of *Colours*: here thy aid,
 Great NEWTON! we invoke, since all her realms
Philosophy discover'd to thy view!
 Whether spectators or exist, or fail,
 Whether the Day or Night possess the World,
 Matter retains Extension, solid Bulk,
 And Figure: but the charms, which strike our sense,
 Are relative, external, secondary. 335
 Thus Taste, and Smell, and Sight are in ourselves;
 Sensations; not inherent in the thing
 Tasted, or smelt, or seen: nor in the fire
 Is Heat, but aptness to excite in us

The

The sense of heat : nor in the rays, which fly
 From various bodies, *Colour* properly
 Resides ; but in idea, when the eye,
 Struck by the ray of a determin'd form,
 In due direction, wakes the adapted sense.

When towards a denser medium rays proceed, 345
 They turn aside *refracted* ; this effect
 To an attractive impulse we ascribe :
 When from the polish'd surface they revert,
 This we describe *Reflection* ; nor require
Contact : but at a *Distance* definite,
 Proportion'd to the surface which reflects,
 We judge *Repulsion* to prevail : nor all
Refract alike, nor equally *reflect* :
 Nor, passing through the center of a sphere,
 Transparent, does the ray direct endure 355
 The least *Refraction* ; equal on all sides
 Attracted ; while the rays, obliquely falling
 On either side, each in degree decline :
 And, if of equal force, the same in kind,
 Thence *homogeneous* nam'd, the distance, taken
 From the direct diameter, will give
 The measure of *Refraction* : if the rays
 Differ in force, each in their order yield
 Refracted by the medium more or less,
 As is the force to every class assign'd. 365
 Hence colours in arrangement musical,
 Of order and extent, exactly spread,
 Ever obedient to this simple law.

First in the rank the potent *Red* commands,
 The least *refrangible*; and next is seen
 The vivid *Orange*; the third order holds
 The colour of resplendent *Gold*; the fourth
 Delightful *Green*, the modest arbiter
 'Twixt both extremes; the Earth's refreshing vest
 Is with the gentle colour mildly grac'd; 375
 Which neither tires with melancholy shade,
 Nor with excessive rays o'erpowers the sense;
 Pleas'd in the emerald, on the soft brown hair,
 To rest; or beam upon the snowy neck:
 Next, in the robes of Heaven, comes lovely *Blue*;
 And sixth the pensive *Indigo*; the seventh
 By sweet transition vanishes in air,
 The fainter *Violet*, to whom is given
 To close the beauteous train: if in the Heavens
 A *second Arch* appears, the colours shew 385
 In soft reflection their inverted ranks.

The texture, whose fine pores and polish'd form
 Reflect all rays in blended Harmony,
 Is perfect *White*; Beauty's distinguish'd hue:
 That, which absorbs them all, is gloomy *Black*;
 The robe of Night and Death: that, which *reflects*
 A certain class of rays, while it absorbs
 The rest, conveys the idea to the sense,
 Excited by those rays which it *reflects*,
 Or *red*, or *yellow*, *green*, or vivid *blue*: 395
 And often with the angle of the sight
 The colours vary: on these principles,

When

When the full Sun darts his refulgent ray
 Through globules of descending rain, the beams
 Refracted in proportion as the drops
 Are higher in air, or nearer to the Earth,
 Offer a various angle to his light,
 And, on the cloud reflected, represent
 The charming colours, beauteously arrang'd
 In perfect order, of the glorious *Bow*, 405
 The sign of Peace, and of a world serene:
 And hence, by alter'd texture, CHEMISTRY*,
 Uniting liquors colourless, creates
 The pleasing lustre of the *green* or *blue*,
 Changes, annihilates, and recreates.
 And to the *subtile Angle* of the view
 The *Dove's* fair neck now radiates, bright with Gold;
 Now shines with Sapphire, now in Emerald beams:
 And hence the glories of the Peacock's train;
 The varying beauties of the Evening clouds; 415
 And all the enchanting powers of magic light,
 In countless hues o'er fair Creation spread.

Behold, in the sweet flowery world, how fair
 The living colours! Rare the dazzling *Red*,
 Rare the proud glow with which *Aurora* gilds
 The Summer morn: the fiery *Yellow* rare:
 Nor frequent pours the *Scarlet* on the eye
 Her strong effulgence; save where gelid climes*
 Ask the refreshment of the vivid ray.
 Such brilliant hue, O *Finland!* animates 425

* V. note.

Thy frozen rocks : on these *Chueva* winds
 Luxuriant ; glorying in her lively *Green*,
 And radiant honours of her noble flower ;
 And the empurpl'd moss spreads o'er the scene
 Peculiar lustre : but these powerful hues,
 Less beauteous than sublime *, Nature imparts
 Seldom : nor oft delights to see the train
 Of *Flora*'s lovely progeny, adorn'd
 In the rich pomp of variegated dyes,
 Speckled or streak'd ; but with one simple tint, 433
 Modest and soft, her favour'd flowers engage
 The pensive eye : pleas'd with the gentle *Blue*,
 The *Pink*'s mild radiance, and the lovely *White*.
 The blushing *Rose*, the fair *Campanula*,
 In the light mantle of the azure Heaven,
 The *Jessamine* of simple elegance,
 Court my EUDOSIA's hand : O suffer them,
 With heighten'd grace, to spend their humble charms
 Upon thy bosom ! See, my rural Queen,
 Unostentatious Nature how she guards 445
 From opposite extremes ! The dusky *Brown*
 And melancholy *Black* scarcely are seen
 Midst the variety of countless hues ;
 Such tints, obscure, she spreads with cautious hand,
 Cloathing the venerable oak, the elm,
 And stately poplar : thus the deepening wood
 Strikes with religious awe : yet even here
 The polish'd ash, the brighter aspin shine ;
 And the smooth silvery rind betrays the *Beech*.

* V. note.

And see how bright the songsters of the grove, 455
Chiefly beneath the burning Zone, how flames
The animated gold upon the wing!

The glorious *Crimson* and the *purple* pride,
Too dazzling to behold! But yet not less

The modest *Nightingale* delights the eye,
Clad in her simple russet; or the *Swan*

In placid dignity; her graceful form
Vested in *white*; beseeeming well the car
Or of *Apollo*, or the *Paphian* dame.

But O, how shall my gazing eye instruct 465

My tongue to sing those colours which adorn

The fairest work of NATURE! O, how paint

Those animated, soft, attractive tints

Which mock the pride of art! the varying glow

Where Sentiment, and Tenderness, and Joy,

And Modesty, and perfect Beauty speak

To the empassion'd heart! Hail, lovely Light,

Spirit of Nature, hail! ineffable

As thy great Author, unexhausted source

Of life and comfort! awful minister 475

Of science! Hail, glorious interpreter

Of the divine Creation! Without thee

Society were none; Pleasure, or Ease,

Or active Health, or Safety; stagnant all,

In the chill horrors of eternal Death.

More might I speak of rays which, *parallel*,

Simple Reflection to the eye returns.

And the harmonic scale: for Nature opens

Pro-

Proportions musical in all her parts :

And of the *convex* glassy orb, which throws

483

The rays *diverging*, and enlarging thus

Their angle, gives an image to the sight

Stupendously encreas'd and magnified :

Much of the *concave*, whose contracting power

Brings in *convergence* to a *central* point

The *devious* rays : but from the starry spheres

Too far the captivating tale would lead :

Though from these laws the great interpreter

Of the celestial orbs, the *Telescope*,

Derive her power.—

493

The *Phases* call us now

Of the revolving *Planets*. *Luna* most

Attracts the observance, image of the rest :

One while her side, remotest from the Sun,

To Earth presenting ; then, by quick advance,

The new-born *Crescent* points, till, full oppos'd

Beyond the Earth, her lucid hemisphere

Reflects in ample orb the radiant Sun :

Thus *Mercury* appears in varied Phase ;

Thus *Venus* shines ; while *Mars*, and *Jupiter*,

503

And *Saturn*, since their orbits more remote,

Move not included in the orb of Earth,

Are still at full to us, nor seen to change.

There is a time, well known to husbandmen,

In which the Moon for many nights, in aid

Of their autumnal labours, cheers the dusk

With her full lustre, soon as *Phœbus* hides

Beneath

Beneath the Horizon his propitious ray :
For as the angle of the line which bounds
The Moon's career from the Equator, flows 515
Greater or less, the orb of *Cynthia* shines
With less or more of difference in rise:
In *Aries* least this angle: thence the Moon
Rises with smallest variance of times,
When in this sign she dwells; and most protracts
Her sojourning in our enlighten'd skies.
In Autumn *Aries*, to the Sun oppos'd,
Allows the full advantage of those beams,
Which, in her brother's absence, she imparts.
Of *Twilight*, kindred are the principles : 525
Least in the *equinoctial* Zone, for there
Aurora with direct ascent illumines
The golden East: nor linger the fair steeds
Of *Hesperus* above the Western bound;
But sudden Night assumes her short-liv'd reign;
While, most propitious to the *frigid* Zone,
Which most requires the long protracted gleam,
The oblique spire of the revolving Earth
Sees in the horizontal verge, detain'd,
The parting radiance slowly fade away : 535
And long the arch through which refractive light,
Trembling, pervades the higher atmosphere:
While in the *temperate* the mean prevails;
Nor rapid, nor with tardy step proceeds
The gentle Dawn: blushing with modest grace
She rises, lovely harbinger of Day;
And with mild dignity at Eve retires.

Nor only with the clime diversified
 The Twilight differs; but the *annual* course
 Of Earth attempts like variety: 545
 And hence, near Summer, the diurnal arch
 Never so distant from the Sun retires,
 That total night should veil our hemisphere:
 Therefore with us continued Day prevails
 A *Month* entire; but least to us the space
 Of *Twilight*, when the *autumnal* Equinox
 Some few degrees is past;—near to which time
 The Moon's auxiliar light repairs the loss;—
 Or when the wintry *Fishes*, half retir'd,
 Prepare the way for vernal *Aries*, 555
 The herald of the Year's renewing reign.

Now of the TIDES by what determin'd law
 Threatening they rise; and peacefully subside,
 From their proud swell to their appointed rest,
 Let me attempt to speak: while still the same,
 The great NEWTONIAN Star, directs my path,
 And through the intricacies lends a light,
 Potent, to pierce the labyrinth obscure.

First, *Earth* and *Moon*, each by the common law
 Of Gravity attracted, move; whose power 565
 Is as the square of distance: thus the Moon,
 Who rules the Tides, with a much greater force
 Affects those parts, which nearest to her sphere
 Meet its attractive influence, than those
 Which form the center of the spheric Earth:
 And

And more the center, than the point oppos'd,
 Remotest from the Moon. The sea thus rais'd,
 Where nearest her, by gradual decline
 On each side sloping, figures an *Ellipse*
 Around the Earth : the greater axis points 575
 Where strong Attraction *rears* the fleeting wave,
 And, on the side oppos'd, where rises free
 The full wave, swelling from the narrow'd sides,
 Balancing by the force *centrifugal*
 The parts most distant from the *attractive* force.
 Thus *equally* at both points high the Tide,
 Where *nearest*, and where *farthest* from the Moon:
 And, as the Earth whirls in diurnal course,
 Twice *ebb* the daily Tides, and twice they *flow*;
 While both the Earth and Moon their orbit keep,
 By due *Libration*, round the common point *, 586
 The center of their mutual gravity,
 Which falls but little space beyond the Earth.
 When *Earth* and *Sun* are join'd in central line,
 And the *Tide* ruling Moon or *opposite*,
 Or *new*, and in conjunction with the Sun,
 Their joint power swells the sea in ampler Tide:
 But at the *Quarters* the attractive Sun
 Deducts, and lowers the diminish'd wave.
Aries and *Libra* give the highest rise 595
 To the ascending main : for near that time
 The silver Moon acts closest upon Earth :
 Though not exact : for the imperious Wave
 Swells highest ere the *vernal* Equinox

* V. note.

Is full arriv'd ; nor puts forth all his strength
 Till the *autumnal* Equinox is past :
 Nearest approach to an *Equality*,
 Towards the *solstitial* points, the *Ebb* and *Flow*.
 Nor, when the Moon in her Meridian rides,
 Is the Tide *highest* : for in this effect 605
 Accumulative lapse of time prevails ;
 As not beneath the Sun's meridian ray
 The greatest heat is felt : and if the force
 Which rais'd the Tide, should sink annihilate,
 Still for some space the Tide, impell'd, would rise.
 As a *REPUBLIC* ; which, by slow degrees,
 Rising from weak beginning, has subdued
 The rival States *, till by the conflict brought
 To her meridian virtue : thence with ease
 She flourishes ; in commerce, arts, and arms 615
 Supreme : but now comes treacherous Luxury,
 Sordid Corruption, and the lust of Power,
 While Self-dominion totters : still, sustain'd
 By the effect of her past strength, she stands :
 Till ere her sons, degenerate, see her sink,
 Into the gulph of empires she is fallen.
 The greatest elevation of the Tide,
 In open Ocean, nearly will amount
 To *twice* the height of man : but in the streights
 Like those, O Bristol ! midst thy towering rocks, 625
 The haughty Tide encreases ; the fierce wave
 Struggles, and the accumulative surge
 Lashes the cliff : and often such a Tide

* V. note.

Eight times exceeds that of the open main.
But situations vary without end.

The *Flow* and *Reflux* of the main; as shores
Winding, and Tide concurrent, issuing
From diverse seas, affect the general law.

And later, by some hours the Western coast
Of Europe, from Ternay e'en to the point 635
Where Africa presents the Cape of Hope:

Later, America, thy Western coast
Rises, than does the East of either world.

The lakes, which by a narrow isthmus join
To the main ocean—such the Caspian sea,
Such is the Euxine—have no certain Tide
Of memorable note: but most renown'd

Is the Tonquinian Bay; whose various flow
The Star of our Philosophy refers

To double Tides; from the Pacific Main 645
One; and the second from the Indian Sea.

But since in *Water* by the attractive Moon
Such Tides are rais'd, greater we may expect

In the much lighter and incumbent *Air*,
Whose gravity not the *eight hundredth* part
Of water equals: yet invisible

The conflict: and, when felt in its effects,
We rest, referring vaguely to the winds.

What wonder if the Moon, in her full force,
Raise tempests in the *fluid* atmosphere, 655

And cleanse the sky, and dense the yielding air,
Purified! What the wonder if retir'd,

Pressing the sea and air with lessen'd force,
The

The lighten'd atmosphere she frees ! The Tube
 Sees the suspending Mercury descends :
 And floating vapours in the rarer sky
 Hover upon the hills, collect in clouds,
 And fall in plenteous rain ; The sudden storm
 Swallows the plain, scourges the rocky shore ;
 Bears harvest, cattle, and the shepherds huts 66;
 Down the mad wave: the drooping nerves relax,
 The muscles lose their tone, active before,
 By the full pressure of the denser Heaven :
 The languid bird her ill-supported wing
 Drops ; silent are the groves, till clear'd anew
 The elastic Air resumes its energy :
 Then lightens gay Sensation ; then arise
 New motions in the breast : the herds rejoice,
 The feather'd choir, and Man himself partakes
 In the affecting instinct. Nor alone 67;
 The Seasons feel the lunar influence ;
 But Phrenzy and blank Melancholy own
 Her awful power ; and that afflicting plague,
 Which in thy person, JULIUS, aveng'd
 The wrongs of Rome, and dearly recompenc'd
 Pharsalia's plains, and the subjected world.
 Although the mimic of Philosophy,
Astrology, the easy ear delude,
 Feigning false miracles ; still Nature's self
 Produces true and greater : at the call 68;
 Of *philosophic Virtue* Nature lends
 Her aiding powers to Art, and gives to know
 Diseases and their cure : and to the skies
 Imputes effects wise and beneficent.

Thus great URANIA to inferior Earth
Imparts her blessings. Thus of the Eclipse,
Which hides the Earth from the refulgent Sun,
And veils the Moon in shadow of the Earth;
The Phases of the Planets; and the Tides
Which raise and sink the undulating Sea; 695
Attentive to the sacred Muse, we sing;
If haply we may hear her heavenly voice,
And give some notes on this great argument
To future ages, as by her inspir'd.
But now our wearied car requires to rest,
And give awhile our winged couriers breath.

END OF THE FIFTH BOOK.

17

THE HISTORY OF

THE CITY OF LONDON
FROM THE FIRST BEGINNINGS
TO THE PRESENT TIME
IN SEVEN VOLUMES
BY JOHN STOW
ESQ.
LONDON
Printed by I. B. for W. B. at the
Sign of the Sun in St. Dunstons Church
in the Strand
1687

THE HISTORY OF

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E U D O S I A.

B O O K VI.

ON COMETS; THE ELEMENTS; AND ELECTRICITY.

NOT now the Earth, or planetary spheres,
Familiar to our System; but a scene
Of ampler range invites. Above the Earth,
Above the waves, beyond the lunar orb,
The sphere of *Mercury*, and thine, O *Mars*! 5
And thee, remotest *Saturn*, we aspire,
To trace the flaming COMET: high we soar;
URANIA guides the rapid car, and points
The awful wonder. See how deep in night
The vast orb slowly moves: and now it views
The Sun enlarg'd, and with encreasing speed
Advances; pouring forth in ampler folds
Its heated Atmosphere! Look with what flight
Precipitate it cuts the dazzling path
Of *Mercury*, and, like a giant loos'd, 15
Rushes upon the *Sun*! What hand shall stay
The dire collision! Angels turn the course
Of the terrific Star, lest the dread shock
In chaos plunge the desolated worlds.

But see, obedient to the destin'd curve,
He now has pass'd the Sun, and to the Earth
Descends: the horrors of his awful train
Above the radiant path of *Venus* flame,
And blaze through the Earth's orbit: Terror rides
O'er prostrate nations—Spare thy guilty Earth, 25
O Sire of worlds! O universal Lord!—
Nor ends with Earth the track of fire: for see
The expanding conflagration threatens *Mars*,
And rushes yet beyond, astonishing
The Star of *Jupiter*; while still the orb,
From whence this fiery deluge pours, beholds
The Morning Planet shine below his sphere:
Nor yet is pass'd so far beneath the Sun.
But see his Train *decreases*: on he moves
With mitigated fury; more and more 35
The angry atmosphere subsides.—Behold,
As from the Earth he travels towards the Sun,
From the dusk horror of a turbid red,
How beams the silver radiance of his Star!
Lessen'd appears the sphere of *Jove*; the orb
Of *Hesperus* shines with inferior light,
Fainter and fainter now: with viewless train,
And head that seems a telescopic Star,
He lessens momentary to the sight:
And as a lover views the parting sails, 45
Which bear his happiness away to shores
Forbidding a return, his trembling eye
Stretch'd o'er the envying space, till the tall mast
Escapes his aching sight, yet still his thought

Dwells

Dwells on the view in melancholy trance :
 So view Philosophers the sinking ray,
 Which *twice twelve* years*, self-multiplied, is deem'd
 Scarce in *completed period* to restore.
 Incredible the vast velocity
 In *Perihelion* nearest to the Sun : 55
 Incredible the slowness of its course
 In the *Aphelion*, when the farthest point
 Of its long axis views the distant Sun :
 And passing thought the amazing space it fills
 In its stupendous orbit ; which to sense,
 Produc'd in such a length, appears a line
 Direct ; but Reason sees the *elliptic curve*,
 And still the eccentric Planet keeps the law,
 Which all revolving bodies must obey,
 Of *equal area trac'd in equal time* : 65
 And still the *periodic Square* agrees
 With the *cub'd distance of the central Sun*.
 By *geometric law* the *Period* fixt
 For the return of *Comets* corresponds
 To twice the *cometary Axe*, compar'd
 With distance of the *Planet* : nor alone
 Celestial THEORY ; Conjecture, prov'd
 Already by Experience, verifies
 Their periods and returns : thy honour stands,
 Sagacious HALLEY, in conspicuous light, 75
 Thou great supporter of NEWTONIAN truth !

* $24 \times 24 = 576$: the period of the COMET of 1680
 is computed 575 years.

Since, from a journey far beyond our worlds,
From the void darkness of unbounded space,
One glorious visitant hath re-appear'd.
Roll centuries, but hope not to o'erwhelm
The splendor of these venerable names
In your all-burying gulph: Cities shall fall,
Empires be quench'd; and heavenly Science change
The seat of her dominion. Who shall say
How large a part of the illumin'd Earth 85
May sink beneath the night of Ignorance;
Corrupted manners and despotic sway
Extinguishing the lustre of the soul?
Then comes the witness of Philosophy,
The long predicted Star; and, while appal'd
The servile nations shrink beneath the glare
Of the terrific train, and tyrants ask,
Trembling, what means the horrid prodigy,
One haply then recalls their groveling thoughts,
And with the awful name of NEWTON fills 95
Their uninstructed ear—This, he exclaims,
This is the Star from ages past foretold;
When, as obscure Tradition testifies,
Our Country reign'd in Arts and Arms supreme,
Then NEWTON liv'd, the oracle rever'd,
The imperial Sun of those enlighten'd days:
He saw this splendid wonder, and the hour
Of its return predicted; now our eyes
Bear record to his art, who read the Heavens:
No evil the appearance menaces, 105
But points the road to Truth, Science, and Good:
And

And bids our minds revive their dormant fire,
Be virtuous, wise, and happy. Thus, perhaps,
If gloomy Error shall o'erspread the realms
Of honour'd Europe, shall the *Comet* wake
By its return the darkling world—avert
For ever the dire omen, gracious Heaven!
Of such relapse to Ignorance and Vice!
O may Philosophy and Freedom join'd,
Virtue and Happiness extend their reign 115
To lands wherever plac'd, who pine in want
Of these first blessings! never may they leave
The soil their hallow'd steps have consecrated!
And by the name of British worth, the deeds
Of our forefathers, and the hand of Heaven,
Which placed thee on the sacred eminence
Where Liberty and Wisdom sit enthron'd,
With Peace and Glory, never be it thine,
O my lov'd Country! thus immerg'd in night,
To need the awakening of the heavenly signs! 125
But may they each revolving still behold
Thy sons, in the full day of Science, free,
Happy, and friends of human happiness;
Grateful to own, and vigilant to keep,
That bliss, which flies from Vice and Slavery,
And never will abide with Indolence,
Nor walk in Dissipation's giddy round;
And, banish'd once, may never more return.

Though *Comets* know their period, still not all
Perhaps revolve: some the projective force 135
Through

Through countless worlds, and systems without end,
May hurry, and to atoms dissipate
Their solid mass: while Gravitation draws
Others into the Sun: nor void of use
Can we believe their trains: our Atmosphere,
More gross, may drink the vapour, and derive
From the ethereal fluid kindly dews:
While Vegetation, thus from worlds remote,
Borrows new life; and purer spirit breathes
Fresh vigour through the planetary spheres. 145
Contemplate their degrees of heat and cold:
The sense shrinks from the dire vicissitude:
For frozen *Saturn* burns like *Mercury*,
With the chill Comet most remote compar'd;
And rapid *Mercury's* most ardent Heat
Is *Coldness* to the blazing Comet's orb,
When *nearest* to the solar Fount he drinks
The sea of fire: hence some have thought their orbs
The habitation of unhappy souls
Compell'd to suffer in the fierce extremes, 155
By change more fierce, of freezing cold and flame:
But such their number, even late observ'd,
Exceeding all the planetary train,
Or prime, or secondary, yet descried
Within our system, as may best incline
To think the wisdom of all-gracious Heaven
Hath destin'd them to milder use: perhaps
To feed the Sun, absorb'd into his sphere,
As more approaching with each fix'd return;
And thus recruit the mighty source of light 165

And

And genial warmth, by which our system lives.
Various their *Magnitude*: the dreadful Star,
Which most hath flam'd, and nearest to the Earth,
Not much exceeding the small lunar globe:
While one near thirty times exceeds in size
This *solid* Earth. And if inhabited,
The sense of their inhabitants who knows
How to their seat adjusted? Who can say
How much their atmosphere, when near the Sun,
May strike his ray refracted *, and abate 175
The magnitude of his *tremendous* orb,
Which otherwise would o'erspread their Heavens?
How mitigate the ardor of his beams?
Or when the most remote, their air condens'd,
May spread the ray more ample and enlarg'd,
And nearly thus compensate what is lost
By his amazing distance? Who can speak
Their *Density*? Who say how variously
Their orbits move, inclin'd? or the *Appulse*
Might strike unknown confusion thro' our worlds,
Raising enormous tides, in *Deluge* pour'd, 185
Or darting conflagration? One of these,
While the rest move innoxious to our globe,
Perhaps is destin'd for the awful hour,
When Earth shall flame, the Dead arise, and GOD
Appear in judgment: but these mysteries
Not Angels know: and Fancy, overpower'd,
Back to the visible diurnal sphere
Directs our flight.

* V. note.

From the remoter Suns 195

URANIA turns her car; retiring worlds,
 And ample systems, to a point contract:
 Here *Saturn* re-appears: pleas'd we behold
 The Sun of our own system, scarce perceiv'd,
 Like the young Moon when first her crescent dawns:
 But greater now, and like himself, reveal'd,
 He shines a flood of light. O radiant orb!
 'Tis not for mortal eye to bear thy beam;
 Hail, Earth! revisited from long career
 Of unimagin'd space! Hail, feat assign'd 205
 Of our probation! School of PIETY
 And VIRTUE! Who shall lead their faithful sons,
 And place the Heaven and Stars beneath their feet;
 Vice and Disease, and Fear and Death subdued:

Here *, while we see the fury of the waves,
 The mad'ning winds; the air in fiery storm,
 Bending the knotted oak, and blasting life
 With instantaneous bolt, untaught to spare
 The beauteous softness of the female form,
 Glowing in youth and innocence, but snatch'd 215
 From the expectant arms of virtuous love:
 When Pestilence, walking in darkness, treads
 Upon her breathless thousands; Earthquakes burst
 The *solid Globe*, and cities, populous,
 Perish at once submerg'd; the astonish'd soul
 Fears to enquire, yet longs to comprehend,
 Why from *Perfection* such *Disorder* springs,

* V. note.

Such dire calamity ! But grant the World
 Eternal summer, gales of endless health,
 No Tempest, no Disease, nor Death, nor Age, 225
 Nor Vice tormenting its inhabitants,
 Should we not ask, why not a *larger* World,
 And *more* inhabitants ; why not *more* Worlds
 Of equal good ; why not an happiness
 Still greater ? For infinity of power,
 Whatever it produces, still includes
 The undiminish'd faculty from whence
 More may proceed, and better, without end :
 Still the Creator infinite ; and still
 Finite, whate'er beside can have a being. 235
 Besides, events to our imperfect sight
 But ill determine : nor the *wise* and *good*,
 Whose fate, to us untimely, shocks the most,
 Die ever immaturely ; if remov'd
 To safety, and for happiness reserv'd.
 Whatever Lightning spares, pass a few days,
 The common fate of Nature strikes, and Time
 Mows down the wither'd harvest for the grave.
 Nor frequent pestilence, or the dire shock
 Of earthquake : on the desert wilds the bolt 245
 Falls ofteneft ; on the vast of ocean spends
 Its rage, innoxious to the peopled Earth,
 And seas where Commerce spreads her crouding sail :
 Nor do these awful signs of Power supreme
 Not benefit mankind ; if but in part
 They limit the audacity of guilt,
 And teach to man his sole dependency.

T

Who

Who will accuse the tempest when it broke
 The fleet of XERXES, scatter'd on the shore
 Of generous Greece? or who will blame the storm 275
 Which spread the wreck'd *Armada* round the coast
 Of rising England? When the Arm divine
 Not thus appears, let this content the search:
Hid, or reveal'd, the DEITY is ONE.

Rather than charge the guiltless ELEMENTS,
 Let us explore part of their various use,
 Small part indeed, for boundless is the theme.

AIR first surrounds our Earth; and haply all
 The planetary orbs;—though destitute
 Of Atmosphere and Water seems the Moon;— 285
A fluid; since on all sides it gives way
To slightest pressure easily; produc'd
 From all, or nearly all, the substances
 Which Earth contains: of various density,
 And of *elastic* force proportional;
 Decreasing with the geometric scale
 Of its advancing height: and thus beyond
 A certain limit, nearly of *eight* miles,
 Suppos'd to reach from Earth, so rarefied,
 As to become in its effect to sense 295
 Merely a Void: to this agree the bounds
 Experienc'd of Refraction, when compar'd
 With the Earth's Radius*: but the Aptitude
 Of Air to human use, what tongue declares?

* V. 1. etc.

Fire without this is dead : as the machine,
By which this fluid we *exhaust*, decides ;
And the blood stagnates if depriv'd of Air ;
Nor Life a moment acts : if this support
Were wanting, all the feather'd tribes must drop
The useless wing. Nor less all-aiding Air 275
Is Vehicle of Light ; reflects and gives,
Through its enlarging medium, to the eye
The strong refracted ray : without this aid,
Turning but adverse from the mid-day Sun,
Our eyes would feel intolerable light,
Converted instantly to total dark.
Nor less the Air is Vehicle of Sound ;
Remove but the *elastic* pulse of Air,
And the same Ear, which now delighted feels
The nice distinction of the finest notes, 285
Would not discern the Thunder from a Breeze.
Hence the full strains excite the awaken'd soul
To high attempts, inspiring with the zeal
Of ardent courage : hence the Spartan flute,
In well attemper'd notes, *firm* Concord breath'd,
And *steady* Resolution : hence the heart
Vibrates with pitying Sympathy and Love ;
And, heighten'd, hence Devotion glows, sublime.
By this conducting medium to the heart
PERICLES pierc'd the way ; DEMOSTHENES 295
Pour'd eloquence resistless on the soul :
By this the Roman ROSCIUS, and the pride
So late of England's theatre, possess'd
The captivated ear : and O by this,

Immortal LIBERTY ! cease not to speak,
 In strains not yielding or to Greece or Rome,
 Pleading thy cause, to Britons ; to the race
 Of those who rear'd thy temple with their blood :
 Energy and Persuasion all are thine,
 And canst thou plead to Englishmen in vain? 305

What should I speak of *vegetable* juice
 By the Air's pressure through the subtile tubes
 Of trees, plants, herbs sublim'd ? while rarefied
 By languid Eve, the yielding Air allows
 The opening veins to drink reviving dew ?
 And e'en thy agitated waves dispel
 From ventilated sky the seeds of death,
 Strengthen the body, and confirm the mind
 To active toil, and hardy enterprize.

What, shall I speak thy various services, 315
 Condens'd or rarefied, in the wide range
 Of useful arts ? the Engines which conduct
 Streams to support a great Metropolis ?
 The life-sustaining labours of the Mill ?
 The Sails of Commerce borne by thee to join
 Remotest Continents, and satisfy
 The mutual wants of every different clime ;
 And nourish arts, and humanize the world ?

What, shall I speak how thy pure Balance weighs
Specific Gravities ; and thus detects 325

Error

Error and latent fraud, when most disguis'd *?
 Or how relate the subtile influence
 Of thy just Pressure on the *exhausted* tube,
 Where the suspended Mercury foretells
 The secret storm; informing when to trust,
 When doubt the promise of a *pure serene*?

WATER in common properties agrees
 With AIR; since both are *Fluid*: both concur
 To show that gravity is *relative*
 To the surrounding Medium: for in Air 335
 The Cork or Feather rapidly descend,
 Which in the Water swim: a fluid use
 Denser than Water, such is Mercury,
 And every ponderous mass; but Gold alone
 Will swim with ease: and since on every side
 The fluid presses, with an equal force
 Proportion'd to the Column of its Height,
 The yielding Water may be made to buoy
 Or Lead or Gold, if artfully so much
 Be made to float above the weight immers'd, 345
 As, in proportion to the mass entire,
 Equals the Difference of Gravity
 Between the Fluid and the *solid* Mass.
 Therefore, in perfect void *, the medium lost,
 To which specific gravities are weigh'd,
 All substances with like velocity
 Descend; nor the soft down outstrips the gold:
 This at the first our numbers intimated.

* V. note.

All homogeneous fluids, which ascend
To equal heights, and join in equal base, 355
Balance each other; howsoe'er in form
Of the containing vessel disagreed,
Or in the fluid quantity contain'd.
Upon this rule Barometers depend,
By this the aggerated Dyke resists
Incumbent Ocean, and defends the shores,
Obtain'd and guarded with incessant care,
O Belgia! from the all-rapacious sea.
Upon like principles alone we live,
Of equal pressure; and included Air, 365
Internal balancing the external force.
Remove the external, and, to atoms torn,
Our dissipated limbs would strew the Earth;
Remove the internal, in a moment crush'd,
By greater weight of the incumbent Air,
Than rocks by fabled giants ever thrown,
Breathless we lie: nor Flesh, nor solid Bones,
Nor Adamant could bear the o'erwhelming shock.
Already we have seen how fluid Air
Suspends, precipitates, and gives to Earth 375
The vapours which sustain her: by like means
In other fluids Nature's secret hand,
Or imitative power of chemic art,
Dissolves, suspends, precipitates, elects*
The various substances of solid frame.
But while to various medical design
The various fluid menstruum subserves,

* V. note.

Air, *universal menstruum*, indued
With subtle salts and wondrous agency,
Of every mingl'd substance constitute, 385
Potent, though mild, incessant, though unseen,
Gently with lambent spirit bears away
The external particles of earthly things ;
And actuates and vivifies the mass ;
Preserves and renovates : and long retains
Its vital *Elasticity*, unhurt
By the effluvia which, from hour to hour,
When dense and clear, its salutary stream
Absorbs, and of their poisonous quality
Divests. And when its active spring impair'd, 395
Unfit for vital use, and overcharg'd
Labours, fain would I sing how every plant
Of pleasant smell, and wholesome to the taste,
Or of offensive venom, gives alike,
When by the solar ray touch'd and sublim'd,
Recruits of vigour to the *enervate* Air* ;
And Health, and Joy, and Beauty to the world :
And of the fix'd ; the nitrous dense, divest
Of Fire, which saturates our common Air,
How in its medium purer glows the flame, 405
But lives less time with more consuming waste :
Hence, breathing this, more vigorous the nerves,
More pure and animated flows the blood.
But this for others to commemorate,
I leave: the mighty field in which, display'd,
The glorious labours and sagacious art

* V. n. —

Of PRIESTLY shine, above the highest praise
Of Eloquence, above the powers of Song.

Of FIRE should we attempt to speak, which dwells
In every substance ; active or inert, 415
Or visible or latent ? As the modes
Of its existence vary, suited names
Distinguish the determin'd quality :
Phlogiston called in quiescent state ;
When agitated gently, *Phosphorus* ;
Electric, when the agitation more :
And when excited in the last degree,
The principle of light and heat exerts
Its utmost force, we give the name of *Fire* *.
Phlogiston, though a mode in which exists 425
The *Element*, which, more *exalted*, takes
The name of *Fire* ; yet, when it saturates
The airy fluid, Fire in such an Air
Sinks, and decays, and speedily expires.
Thus in the dreadful mines of sulphurous coal,
Where, age by age, the inelastic Air *
Lingers in deadly damp, no flame will burn,
Though fierce Vesuvius under Earth should send
His fires, and from beneath invade the gloom :
But if the common Air admittance find, 435
Absorbing the *Phlogiston*, wretched he
Who brings a spark : not all the dreadful force
Of the fam'd powder, whose explosion gives
Wings to the ball, and hurries through the air

* V: note:

Death, wrapt in thunder, with such violence
 Rends the repulsive Atmosphere: at once
 The dreary cavern flames; and, hurl'd to Heaven,
 Timber and fragments of the rocky mine,
 And scatter'd limbs, in fiery whirlwind rise.
 Nor when less terrible the appearance strikes, 445
 Less is the evil: oft the venturous wretch
 Descending in *phlogisticated* Air,
 Instant expires: and haply such the death
 Of those who perish by the Lightning's stroke
 Without or wound, or any slightest trace
 Of violence: therefore the prudent eld,
 This *bane* foreseeing, to small aperture
 Present the trial of the candle's ray,
 Which, if it unextinct descend, secure
 They follow: should it kindle sudden blaze, 455
 Safe the experiment: for in such strait
 Too slowly wins the *atmospheric* Air
 Its passage, and too little blends its stream
 To kindle more than superficial flames:
 But if the taper lose its light, extinct,
 In the contagion of the fatal Air,
 Retire: for instant death is on the verge.
 From animal effluvia such, and steam
 Of countless fumes, in mighty cities hangs
 The tainted, putrid, pestilential Air. 465

Much lighter is *phlogisticated* Air
 Than *atmospheric*; but in Density
 The *nitrous* much exceeds; and most the *fix'd*:

U

Which

Which oft, beneath the Air inflammable,
 Hangs at the torpid bottom of the pit.
 Such breathes the Italian grot: such metals yield
 In acid effervescence: such the Air
 Expell'd from the *calcareous* Earth, which thence
 Grows *caustic*: such with suffocating blast 474
 Broods over vaults charg'd with fermenting wines:
 And fumes from kindled gunpowder, and streams
 Copious from charcoal.—Deleterious draught!
 Than which no danger of more treacherous kind
 Invades by instant blow, or fatal love
 Of sleep—never again to be dispel'd—
 The life of man: and from these dire effects
 The fix'd, or the inflammable, receiv'd
 Into the lungs, their dreadful name obtain,
 Call'd by Philosophy *mephitic* Air:
 Such as poetic Fancy feign'd to rise 485
 From the infernal cavern. But the *fix'd*,
 Hostile to Breath, is friendly to the Blood,
 Attempering the *phlogisticated* stream,
 Which else would spread putrescence thro' the veins,
 Dissolve the healthy texture, and convert
 Into stagnation the free-flowing life.

The *vitriolic acid* which pervades
 Our wide creation, and perhaps adorns
 Its beauteous vesture with the lovely green,
 Wedded to the *phlogiston*, is presum'd 495
 To constitute the Air *inflammable*:
 The vital food, when in proportion due,
 Believ'd

Believ'd of plants and animals ; though plants
Of the *phlogistic* Air imbibe the most.
And chiefly hence the vegetable world,
And agitated water, has been held
To cleanse the sky, by drinking from its mass
The light redundancy of *phlogistic* Air.

Triumph, ye DRYADES ! the man whose axe
Shall violate your dwellings, and delight 505
To spread a cheerless sight-oppressing waste,
Where Vegetation smiles not, round his house ;
Not only shall the Eye of Taste reprove
His folly, and, averted, mourn the scene
Whence rural Dignity is thus exil'd ;
Not only the upbraiding winds shall howl,
And the fierce Sun's unmitigated Beam
Scorch him, self-robb'd of his defence ; his Health
Shall pine in the *corrupted* Atmosphere :
While who reveres your hallow'd shades shall live 515
With Beauty and with Nature ; and enjoy
Health in the arms of Innocence, and rear
Encreasing glories round him ; the resource
From whence his country, in the important hour,
Shall draw no vulgar aid. O thus, ye sons
Of Britons ! to yourselves be just ; and live
Blest of Posterity : let England thus
Send her unborrow'd navies o'er the main,
Nor for supply precariously depend
On the insulting aid of foreign climes. 525

Triumph, ye NAYADS ! spread your liquid lapfe
 In free, smooth current ; or, exulting, pour
 The whitening torrents from your native rock.
 O, where the grove, the animating stream,
 The hill falubrious ! Exercise and Health
 Call ; and divine PHILOSOPHY invites,
 Confirming ever what the self-taught heart,
 The incorrupted sense by Heaven bestow'd,
 Endears to man : here, ever new the haunts :
 Here Love and Virtue, Peace and Happiness 533
 Dwell in congenial scenes : Creation smiles :
 Birds, and the sportive flocks, and generous herd,
 And the free peasant, and the cheerful maid,
 And ruddy childhood, fill the glowing heart
 With sympathetic rapture : Water, Air,
 And Earth, enrich'd with life ! The approving SIRE
 Blesses his work, and whispers in the breeze,
 These be thy joys, thy genuine good, O Man !

Of the *Phlogiston* hitherto. Succeed
 The *phosphoretic* substances, with ease 545
 On slightest impulse yielding subtile flame,
 But lambent and innoxious ; of their charge
 Tenacious, nor revealing the thin beam
 To open day. Thee, native *Phosphorus* !
 The reaper oft beholds, as he returns
 By Eve, delighted with the living gleam
 Of the fair *Glow-worm* : thus the Indian fly
 Darts through the air his animated lamp :
 And thus, when life is fled, the silvery flame
 Shines

Shines on fervescant flesh : thus near the lake 555
 The unctuous vapour hovers ; fond to play
 Amid the sedges by the darkling skirts
 Of the wide marshy plain, and, dancing, seems
 To guide the wilder'd traveller ; but cheats
 His credulous step, in fond delusion lost :
 So glows Boionian Earth ; and sparkles thus
 For many a league the agitated sea.

Now, my EUDOSIA, ELECTRICITY,
 The recent wonder of our age, the art
 In which delights thy philosophic mind, 565
 As in the lucid order of the SPHERES,
 Commands our admiration ; faintly known
 In antient days by the attractive power
 Of *Amber*, in the language of the Gods *
Electron nam'd : whose secret agency
 THALES, observer of the boundless Heavens,
 Nor inattentive to the Earth, remark'd.
 Nor THEOPHRASTUS *, whose discerning mind
 Merited to succeed Stagyræ's Sage,
 O'erpass'd the wonder : but far greater powers 575
 Successive Observation has descried
 In various substances, inherent. *Jet*,
 For a long space, with *Amber* reign'd ; the class
 Of like attractive virtue, which includes
 Numberless substances, unknown the while.

GILBERT * extended the *electric* realm,
 Fam'd father of the *infant* art : and BOYLE,

Illustrious name! dear to Philosophy
 And Virtue, caught the undiscover'd beam
 Of the *electric* light; nor unperceiv'd 585
 To him was its repulsive force: nor fail'd
 The penetrating GUERIC * to observe
 How bodies, with *electric* Atmosphere
 Surrounded, in their Atmosphere possess
 A virtue to their substance opposite.

WALLIS *, in geometric art rever'd,
 Wondering, observ'd how from the Amber flies,
 Elicited by friction, in the dark
 The *mimic* Lightning: and the first receiv'd
 The quick sensation of the *electric* spark; 595
 Prelude to future Prodigies. Succeeds
 The assiduous HAWKSBEER *: the attracted thread,
 Converging to the *electric* globe, he mark'd;
 And by the approaching touch repell'd; and saw
 The vivid purple flame, far radiate
 From the exhausted tube: nor him escap'd
 The flashing splendours of the excited sphere:
 And he, half cloathing the *electric* glass
 With wax, beheld the exciting hand beneath,
 By the illumin'd medium seen distinct. 605
 GRAY * follow'd him; nor with inferior step;
 And first by the conductor taught to lead
 The *electric* fluid, and in water rais'd
 The attracted Cone, jetting its streams of fire.
 Then *rival* France arose, her active sons
 Learnt that all substances, or nearly all,

* V. note.

Save metals, and the bodies which are found
 Fluid or soft in the extreme, possess
Electric virtue: and confirm'd the truth
 Which GUERIC had conjectur'd, that *whate'er* 615
 Is an *electric*, powerfully attracts
 A non-*electric substance*, till indued
 With *Electricity*; and then repels:
 And nam'd the different *electric* force,
 Each to the other contrary; the one
 Repelling whatsoe'er the other draws,
 The *vitreous* and the *resinous*. Then came,
 Who gave a form and method to the art,
 And technic terms, and first included Air
 In the *electric* class—dear be his fame— 625
 Unwearied DESAGULIERS*: in the rank
 Du BOZE* appears, and with successful toil
 Adds the Germanic honours to the list:
 The first complete conductor he produc'd,
 Improving on the unfinish'd plan of GRAY:
 GORDON the *Cylinder* annex'd, and form'd
 The rudiments of the compact machine:
 LUDOLFIUS first by the *electric* spark
 Volatile ether kindled. As the stream
 From narrow path at first expanding breaks, 635
 Till the full deluge overspread the plains,
 So triumph'd *Electricity*; confin'd
 Long within narrow limits.

WATSON* taught
 How unrefracted it pervades through Glass;

* V. note.

How

How Smoke and Flame conduct. Shall I omit
 The miracle which LEYDEN first admir'd,
 The Phial, arm'd at first with but a nail
 Of iron; Water came in aid; at length
 The close *metallic* Coating grac'd its form, 645
 And then the included Filings, and the Wire,
 And terminating Nob. Who can express
 The astonishment excited by the shock?
 Which softens pain, quickens the languid nerves,
 And rescues from the strokes of sudden death:
 At length, combin'd in awful battery,
 The rang'd battalia of the Phials stand,
 And a new Lightning strikes; new Thunders roll:
 Beneath the stroke fall breathless animals,
 And die at once: but now an happier scene 655
 Expands.—O FRANKLIN! here thy daring art,
 Better PROMETHEUS, from the *pointed* rod,
 Guides the terrific Lightning to moist Earth,
 Innocuous: proves the correspondence full,
 Between the Lightning and the electric stroke,
 And teaches best against the dreaded blow
 The towering edifice, and sacred life
 Of man to guard. And doubt we yet to urge
 The great pursuit? Shun we the glorious toil
 Thus to save life, and benefit the world? 665
 Does Superstition or cold Negligence
 Avert our feet from thy Elysian fields,
 Divine PHILOSOPHY! where VIRTUE tames
 The indignant Lightning, ventilates the Air,
 And vindicates the sovereignty of man,

Bestow'd

Bestow'd by Heaven o'er the created Earth;
 Subduing poisons to a friendly use;
 Healing disease; weakening the darts of death;
 And in that radiant form, with which she glows
 Amid the Stars, o'er Earth and boundless Sea
 Spreading her blessings. Thine, O honour'd name,
 O BECCARIA *! thine the Water-spout
 To trace to its *electric* source, refer'd
 To the same cause which rais'd the wat'ry Cone
 Observ'd by GRAY: thus smallest circumstance
 To greatest leads the *philosophic* mind:
 The same discernment to the *electric* power
 Refers the shock of Air, and the dire blow,
 Whose vast concussion rends the solid Earth,
 And levels cities overwhelm'd at once.

Nor to this subtile cause is ill refer'd
 The Northern radiance: for, while the Earth
 With strong attrition rapidly revolves
 From the Equator, where the swiftest whirl
 Excites the fluid, to the *Arctic* Pole
 And the *Antarctic*, wherefore disbelieve,
 From the dense medium, the returning Light
 May spread, diverging, towards the lighter Air,
 And dart the varying lustre*; such as beams
 Within the *electric* Phial, more and more
 Diffus'd, as to a Vacuum more near
 The Air approaches: these, and more effects,
 Great and illustrious, *Theory* refers

* V. note.

To an *elastic* fluid, which attracts
 Whatever other substances are known,
 While mutually its particles repel
 Each other: near the surface of the glass
 Residing, as reflected light is thought
 To hover near reflecting surfaces:
 On the external side with ampler share,
 From the surrounding substances deriv'd,
Positive; but within, only indu'd
 With its own natural portion, *negative*:
 These, by conducting medium, when transfer'd
 To the external side, redundant pour
 The active emanation, whence proceeds
 The spark effulgent, and the powerful shock:
 And more excited by attrition strong
 The *electric* action ends, and then breaks forth
 Devouring Fire, and from the harden'd wood,
 And stubborn stone, calls forth the latent seeds
 Of Flame to powerful action. Here we rest
 Awhile, preparing to renew our course,
 And terminate the long protracted lay.

END OF THE SIXTH BOOK.

E U D O S I A.

B O O K VII.

HUMAN ANATOMY; THE MICROSCOPE; CONCLUDING RECAPITULATION.

URANIA, daughter of the Sire supreme,
Hear, and assist my now concluding strain;
Which from the various members of the World
Aspires to celebrate the eternal SIRE!
Here all the sacred band, whom Wisdom loves,
Join the full choir: the ONE Omnipotent,
Eternal, the Orphean * lyre resounds:
Singing how from the boundless chaos rose
Creation, by the word of heavenly Love.
Nor less the Samian Sage in the high theme
Concurs: through Earth, the Sea, the starry Orbs,
God, omnipresent GOD, he celebrates;
The life, the spirit of the UNIVERSE!
And thy sublime idea, ARCHYTAS *,
From first, him last, him midst, and without end,
Acknowledges: and HERACLITUS * rears,
Not or in marble, or in sculptur'd gold,
A Temple for the INFINITE; but owns
The UNIVERSE his Temple; where the work

* V. note.

Confesses the divine Artificer.

Night, and the Day, and thou, all-cheering Sun,
 And fruitful Earth, praise ye your Maker's name!
 Thou, universal King, alone art great,
 Alone art wise; source and support of all!
 The Earth, the Heavens, and the *unknown* Abyss,³⁵
 Bow to thy sway; for ever and to all
 The same; all-powerful and supremely good;
 Thus the SOCRATIC * lore; and thus repeats
 PLATO, divine, thy voice mellifluent;
 And XENOPHON of simple elegance;
 And the acuteness of the deep-learn'd Sage;
 And TULLY, penetrating to discern,
 Capacious to receive, and eloquent,
 In all the power of language, to express
 Whatever best Philosophy can teach.³⁵
 But far above soars the *prophetic* fire,
 In language worthy of inspiring Heaven:
 Behold the antient of Uzzean land!
 Whom mighty genius, long experience taught,
 And Patience, vanquishing severest Ill!
 He casts to the refulgent skies his view,
 And thus he sings: Thee, O creating Power!
 The Sun acknowledges; and by thy law
 The Stars are govern'd: the eternal King
 Speaks: at his word the pillars of the Earth⁴⁵
 Are shaken, and the mountains disappear:
 His hand the Heavens hath spread: He to the Sea
 Hath said, " Thus far, but not beyond; here stay
 Thy restless wave, and know thy pride has bounds."

* V. note.

Arcturus and *Orion's* lucid train
 His word created : and the treasur'd shower
 Dwells in the fruitful chambers of the South
 By his command : his the self-balanc'd Earth
 Expanded on the airy void : and his
 The fleecy clouds, which bind the imprison'd rain : 35
 Wisdom is his, Goodness, and Power supreme !
 His compass, circling, mark'd the ambient sea
 Her destin'd bed : at his severe rebuke
 Nature recoils ; the vast Creation starts :
 The UNIVERSE by him exists or sinks :
 Nor falls a drop, nor floats a dust in air,
 Without his providence.—From the clear North
 He darts the vast effulgence : He commands,
 And at his word the Lightning says, " Behold !"
 The Thunder fills the Heaven, and shakes proud
 Earth 65

To her astonish'd center : He forewarns
 The instinctive herd of the impending storm.
 He to the snow hath said, " descend ;" the plains
 Shine with unbounded whiteness ; Winter walks
 In solitary reign ; the beasts, subdued,
 Flee to their dens ; from his unfinish'd toil
 Laborious man retires : the icy chain
 Fetters the Earth.—Great are his miracles,
 Unsearchable his Wisdom and his Power !
 Issues the whirlwind, and uprooted tears 75
 The leafless forest : his relenting breath
 Dissolves the adamant bond ; the dews,
 The kindly rains return : He scatters joy,

Peace,

Peace, and abundance o'er the peopl'd Earth:
 Spring smiles; and Summer, in his ardent strength,
 Beams on the land; and liberal Autumn showers
 His fruits, and bows the harvest to the scythe.
 Whether he pours his bounty on the good,
 Or rends the wicked from their rooted base,
 His will is done; his mighty word is fate.
 Behold his Elephant, towering in strength,
 Docile and peaceable! Advance the spear,
 And pierce the haughty tyrant of the floods,
 The scaly crocodile; whose eyeballs flame,
 As the awaken'd Morning proudly peers
 Above the Eastern hills: Will he retire,
 Shrinking before thy lance? Thy threatening steel
 Is chaff before his strength, and bonds of brass
 Are stubble to his wrath. Hast thou indu'd
 The horse with conscious vigour? hast thou cloth'd
 His neck in thunder? has thy hand diffus'd
 The exulting mane? the living flame that breathes
 From his dilated nostrils, is it thine?
 Cease: and adore, submissive to his will,
 Whose wonderful Creation thou hast seen:
 And know, that *Wisdom is the fear of GOD,*
And man's first knowledge to depart from ill.
 Nor less the Son of JESSE's heavenly harp
 Vibrates with holy rapture: Heaven declares
 The glory of her GOD: the Worlds, which fill
 The infinite expanse, own him supreme:
 Day to the Night, Night to revolving Day,
 Proclaim his Goodness perfect as his Power:

To every nation, every age they speak,
In *universal* language. Thee, the Moon,
Thee; awful Parent, the gigantic orb
Of the all-cheering Sun acknowledges!—
And hear how full the Son of AMOS strikes
The impassion'd strings; urg'd by the majesty
Of Him, at whose decree meridian light
Shrinks into palpable obscure: whose voice
Is utter'd, and the deepest shade of death
Beams with unbounded day. Nor weakly soars,
O son of SIRACH! thy exulting song,
With admiration wing'd, and gratitude
To the all-perfect Being, who hath set
His Bow in Heaven, encompassing the skies
With glorious lustre;—for the Almighty hand
Hath bent the arch, sublimely beautiful;—
And to the Sun, by such adjusted bounds,
Oppos'd the Earth, that not the fiery ray
Consumes, nor the inclement cold forbids
The tender vegetation. Who shall praise
His universal fabric? all the parts,
Consenting or oppos'd, so harmonize?
Exalt your praises to the utmost pitch:
Language shall fail, Imagination faint,
And infinitely still his works surpass!
For he is all!—

I leave the hallow'd choir
Unequal to their heavenly voice: and now
Of MAN how shall we speak, whom God hath made
Spectator, amidst Angels, of his works.

Behold the Countenance divinely form'd,
 The chaste attractions of the Female frame!
 The snowy neck how turn'd; the polish'd arm;
 The lips, the brows mild arch; the modest eye,
 Where Tenderness, and Love, and Pity beam;
 The *Cytherean* Bosom; and the grace,
 The harmony of the all-finish'd form! 145
 And the robust limbs, the awful front
 Of Man!—But who shall speak the miracles
 Of the internal texture? speak how fit,
 Both to continue life, and to enjoy?
 The Bones from fluid harden'd by degrees,
 The Pillars of the living edifice;
 With joints at pleasure flexible; yet firm
 Their solid mass to bear the pliant flesh,
 In *hemi-spheric* cavities to turn
 Inserted; with adjusted Gravity, 155
 Each part conform'd exact to Static laws!
 How utter by what exquisite design
 The *nervous* substance, in connected chain,
 Runs through the long articulated Spine!
 The double column of divided bone
 Which forms the Hand;—inserted from the Arm,
 Where *single* runs the Pillar;—and the Leg;
 While *single*, of proportion'd density
 The column to the spreading Thigh assign'd!
 How the *twin* limbs of our amazing frame 65
 In size and figure correspond; in Veins,
 Arteries, Fibres, and *minutest* Nerves!
 How the defensive Ribs, compact, yet light,

Consist with *gentle Flexure*! How the space
 For the free play of the inflated Lungs
 Is guarded and reserv'd! how vital heat
Attemper'd by refrigerating air!
 That neither too contracted space offend
 Their tender texture, nor impede the effect! 175
 Observe their seat, how elegantly form'd!
 And hence admire the *flexile Tube*, through which
 The air reciprocates; how justly turn'd
 Its numerous Rings; how exquisitely plac'd
 The Valve, lest Food or Liquids interfere,
 And Perspiration cease! the fretted Roof
 Reverberating sound! the Teeth to aid
 Articulation; and the *nasal Tube*;
 The *modulating Tongue*; the *harmonic Throat*,
 Whose manifold and nice Divisions form 185
 The Scale of varied Melody; the Stop
 Which *sharpens*, or to *grave* lowers the Tones!
 The spiral Conch, the Drum, the winding Maze
 Of the adapted Ear; its neighbouring scite
 To the Sensorium in the Brain enthron'd!
 The complicated structure of the EYE;
 Amazing Organ! convex to collect
 The streaming rays from objects numberless!
 Its lucid Cornea; firm, transparent veil;
 The *watry Humour*; the fair Iris plac'd 195
Central; and, in the midst, the Aperture,
 Which to the Retina, that wond'rous net,
 Expansion of the *optic Nerve*, conveys
 The *ever-changing Picture*; while beyond

The darken'd Choroid softens, refines
 The *perfect* Image! Wherefore should I name
 The clear Crystalline; and, exuberant,
 The *vitreous* Humour; whose *refractive* powers,
 With the *pure* Cornea combin'd, converge
 Exactly to a Focus the fine rays 205
 Transmitted to the Retina? Why speak
 The Pupil's narrowing and dilating power,
 Adapted to the Distances and Light?
 And how coincident the Focus gives
 A *single* Picture from the *double* Eye?
 How shall I speak how finely *sensitive*
 The watchful Eyelids guard their precious charge?
 The modest shade which vests their gentle edge?
 The Colour and the Texture of the Eye,
 Fittest to give the subtile spirits way, 215
 To speak the *unutter'd* language of the soul,
 Paint every Passion's *momentary* change,
 And every finest Sympathy convey;
 Interpreter and Master of the heart!
 Why speak the Nerves *olfactory*, which bear
 Distant perfumes to the delighted sense,
 And, by disgusting, warn from noxious steams?
 How the discriminating Palate speak?
 And how the incorrupted Taste rejects
 Things adverse to the sense, and foes to life? 225
 How of the fine resisting Skin discourse;
 Its Nerves, its animated Glands? How tell
 The Touch, most exquisite, through all the frame
 Diffus'd? how of the intricate maze,

The

The soft Medulla, of the Brain? the shell
 Of firmest complication doubly wove,
 Its shield against external injuries !
 And as the insect *, whose instinctive skill
 Weaves the mysterious geometric web,
 Feels in her central dome the impulsive thread 235
 Vibrate with subtle tremor, through each part
 Touch'd, of her pentagon circumference;
 As in an instant the *electric* shock
 Through the communicating Circle runs :
 So through the Nerves the Spirits from each part,
 Winged Intelligencers, bear at once
 Their Information to the *imperial* Brain ;
 Who, as true sovereign of the commonwealth,
 Feels *all* their Good, and suffers *all* their Ill :
 And as from the great source of waters sent, 245
 Innumerable rivers o'er the globe
 Flow from the sea, and to the sea return,
 So by impulsive force the living Blood
 Through Arteries into the narrowing Veins,
 From the Veins *refluent* to the Arteries,
 O'er the whole body rapidly diffus'd,
 With friendly Circulation, permeates
 Each latent tube, and animates each pore ;
 From the Heart streaming to the Heart return'd :
 And thus by mutual Commerce free, and full 255
 As every member can receive and give,
 In union live the sympathetic parts,

* V. Sir JOHN DAVIES' 2d Elegy, p. 45, as edited in the
 Prologions.

Sustaining and sustain'd; a perfect WHOLE :
 Image of a just EMPIRE ! where no Force,
 No *partial* Will, no *stern* Monopoly,
 Prevails ; but LIBERTY and general GOOD :
 And from the voice of the consenting States
 One Law results ; one *vital* Spirit flows :
 Preserves the parts uninjur'd, and maintains
 The mighty WHOLE in Strength and Happiness. 263
 O glorious vessel of Almighty power,
 Wisdom and Goodness ! how shall I express
 Thy miracles, O HEART ! who, while I write,
 Unbid, untaught by me—nor will, nor thought
 Of mine can make thy fountain flow or stop—
 With action all unfelt, incessant feed't
 The springs of *Life*, and soul-informing *Sense*.
 Flank'd by the Lungs, thou, *central* Sun ! command'st
 The *animated* System : a cool bath
 Of chrystal lymph surrounds, and temperates 273
 Thy active heat : around, protecting, spreads
 A close tenacious membrane : vast thy force
 Elastic : astonishing the pulse,
 Alternately contracted and dilate !
 Two *widening* Tubes on either side extend,
 One the *right* Ventricle, which takes the Blood,
 Returning, to transmit it to the Lungs,
 Vibrated through the turgid vein ; and thence,
 With new ethereal spirit animated,
 The *left* receives it, and, exulting, darts 283
 Through the great artery the vivid flood :
 To every limb, and every part minute,

Con-

Conducted by unnumber'd spiry veins;
 And thence through these to the *right Ventricle*.
 Thus the *hydraulic* and *pneumatic* powers,
 With elegance and with perfection join'd,
 Unknown to highest works of human art,
 Conspire: and O what pow'r, what flow of words
 Shall paint the *Chemistry* of Nature's hand,
 Tempering within the *alimental* Tubes, 293
 In all their serpent labyrinth involv'd,
 The daily Food; elaborate to Blood
 And Spirits, by fermentive energy
 And just attrition! How shall Man pursue
 The *whitening* Chyle, as in the mouth receiv'd
 The aliment is press'd, progressive still
 In aptness for nutrition? or how trace
 The comminuted blood in *milky* streams,
 Feeding the *lacteal* vessels? or what thought
 Conceive the particles of Blood, how small, 301
 When its *red* Globules, least reduced in size,
 Run with free current through the *largest Vein* *?
 How of the *golden* Bile shall I discourse,
 Secreted from the Liver? taught to blend
 In due proportions its digestive tide!
 How of the various separating Glands,
 Which, in their order altering, prepare
 The different fluids for their various use?
 The powers of secret Perspiration speak,
 The regulated forces which expel 313
 The noxious and the useless! How relate

* V. note.

The viewless *Germ* from whence these wonders
spring;

The engrafted EMBRYO by maternal life
Fed! by what laws the *fluid* Speck expands,
And hardens into bone! its Lineaments,
Its smallest space complete; the Dwelling made
To grow, adapting to the inhabitant
Its harmoniz'd dimensions; latent Man,
Thy mystic origin and wondrous birth!

325

How speak the causes of successive Life;
The principles of joy, from whence result
Union most perfect, *tendrest social* Ties,
Order, and Bliss of the *continued World*?
Which the two sexes, in Loves happy cause
Combining, animate: for nothing lives,
From Man's imperial order to the worm,
Or from the cedar to the mossy herb,
By such mysterious union not produc'd:
Nor seems it ill, O eloquently sage,

335

Our modern ANAXAGORAS *, with thee
To think, congenial principles of life,
Of each deriv'd, assimilate in one:
And thus the sympathy of blended powers
Active, and more than thought conceives, refin'd,
Gives with unerring truth the general form
Of man, beast, bird, or fish, or humbler plant,
Still faithful to the *kind*: delighted still
The several *species* to transmit distinct:
Nor from discordant kinds Nature permits

345

* V. note.

Confusion to call forth enormous births,
 Mocking Creation with fell prodigies,
 Scyllas and Harpies, and Chimeras dire.
 Nor where like variance seems to overstep
 The modesty of Nature, is the race
 Continued: such the all-controlling law,
 Constant through infinite diversity!
 Thus regular, thus limited the change!
 Thus every order, each determin'd class,
 Owns its just limit, and maintains its bound. 355
 And see, while chaste Lucina waits the hour
 To lead the latent offspring into day,
 Behold what sure affinity attracts
 Each atom to its kindred particles!
 Mark how delineated in finest scale,
 Arrang'd in order of the parent limbs,
 Thence cherish'd with the due supplies of life,
 The human image grows! Admiring, note
 How the maternal features there prevail,
 And here the lineaments confess the Sire. 365
 How—so attemper'd the similitude—
 Live the united parents in the child!
 But o'er these wonders of Omnipotence
 Nature expands her sacred veil: a flood
 Of trembling Awe, with heavenly Transport mix'd,
 Fills the astonish'd soul, and bounds the search!
 The SOUL unknown, or what it is, or where,
 But not unknown its Faculties; which shines
 The image of the DEITY! the Thought
 Ranging illimitable space; thy force, 375

Ima-

Imagination; thy *creative* power!
 Reflection, culling from the boundless stores
 Of Memory; assiduous to combine,
 To separate! Hence the *abstracted* forms
 Of *general* ideas: Reason, queen
 Of the wide world of Passions; Judgment, Wit,
 And playful Humour; and the *moral* sense,
 VIRTUE! the Poet's fire, the Sage's depth,
 The Hero, Legislator, Patriot, Friend
 Of *human* Race, of Angels, and of GOD! 385
 Hence Man—how weak in native powers compar'd
 With various tribes of subject animals!—
 Rules o'er the Earth; and by the simple law
 Of force increas'd, as the momentous weight
 Describes a Radius from the body mov'd
 Remoter, raises to stupendous height
 Obedient Waters, shows thy Pyramids
 The prodigy of ages, fruitful Nile!
 Levels obstructing Mountains, and admits
 Through new made channels the *imperious* wave:
 Checks the proud Ocean, or *diverts* its course. 396
 Hence he deduces the *protracted* chain
 Of *geometric* Reason: through the Stars
 He walks; their Distances, their Magnitude,
 Their Order traces; calculates Eclipses,
 And estimates the Tide: divides the Ray
 Of Light: and sees, with microscopic glass,
 The worlds included in the flowery Dust,
 Or pearly Drop: admires the Colonies,
 Swarming with Millions—which the peopled world

Never

Never has equal'd of the human race— 406
 In almost every grain of whatsoe'er
 Surrounding substance: views their arts, their laws,
 Their passions, their designs, their wondrous works;
 Their empires warring on an Atom's sphere;
 Sees insect whales and latent crocodiles,
 The tyrants of their ocean of a drop!
 Their limbs adapted to their several life;
 Their subtile senses; their amazing frame,
 Furnish'd with animated instruments 413
 For being and enjoyment: hence ascends,
 By just Analogy, to meditate
 How swarms with life the boundless UNIVERSE:
 Or in dead matter—though e'en this perhaps
 Pregnant with life unseen—admires the forms
 Of Salts *dissolv'd*: the chrystal in true cube
 Of unconceiv'd minuteness; *hexagon*,
 Or starry *pentagon*; the *octangular*;
 Certain in figure, as the menstruum
 Dissolving, and the substances dissolv'd, 425
 Determine: glittering with the Topaze-beam
 The Emerald, or vivid Diamond.
 And, when a gentle heat applied, excites
 Configurations, how the branching trees
 Shoot, faithful to their several origin.
 How the keen-darting Spicula protrude,
 And testify their nature: for by these
 Acts mineral poison; lacerates and breaks
 The tender fibres; stimulates the blood
 Beyond the bounds of life; and with dire pangs 435

Z

Dissolves

Dissolves the frame. Nor will he not admire
 The more than Architecture, though of Greece,
 Or *emulative* Rome, which instant springs
 On his astonish'd eye; while glow the spires
 Of Alum, in the loveliest Symmetry,
 And mingl'd majesty of Light and Shade.
 Hence judges of the origin of Gems;
 The process of the Mine; the Harmony
 Of the Creation in its every part,
 Speaking the Maker *infinite*; alike 445
 With him the boundless *great*, and viewless *small*.

But still this exquisite, divine machine
 Self-moving, self-repairing; thus indued
 With sense and sacred life; thus all complete;
 This pattern of the Universe, this pride
 Of Earth, this future habitant of Heaven;
 This creature, in whose admirable frame
 The vegetative powers, the animal,
 The intellectual, and the moral join:
 How oft, while certain *Instinct* never quits 455
 The line of preservation, nor betrays
 The happiness appointed to each class,
 His lordly *Reason*, fatally sublime,
 Refines to error; and his devious heart
 Ranges the flowery labyrinth of vice,
 Regardless of the lurking fate that dwells
 Beneath the roses; and malignant smiles
 On the empurpled bloom of clustering vines.
 How often, not in Pleasure's fairy bower,

But

But 'midst the haunts of Pain and Misery, 465
 Where Horror undisguis'd, and tyrant Death;
 Arm'd in his darkest frowns, triumphant tread
 O'er slaughter'd myriads, does the frantic wretch
 Pursue his brother, trample on those rights
 And blessings upon which depend his own,
 And look upon the ruin of mankind
 As one not born to suffer, or to die:
 While not the thunders of ambitious war,
 Or, Liberty, thy sword, have power alone, 475
 To crush the tyrant of unnumber'd slaves:
 But mere exuberance of the vital flood,
 Redundant Health, and Strength, that mocks at fate,
 War on the throne of life: and oft at once
 Heaven whispers to Man's proud security,
 "Thou fool, no more:" at the resistless word
 The dread of nations is a breathless corse.
 Ah, rather then tear the dishonour'd wreath
 From CÆSAR, and from haughty MACEDON,
 And crown the Friends, the Comforters of Life,
 The blest Preservers! NATURE here invites; 485
 Guided by her benignant hand, the ill
 Oft remedies itself, and kindly pain
 Heals where it wounds: such in the better days
 Were once diseases; simple, few, and brief;
 While yet the active sons of NATURE liv'd
 Free, incorrupt; nor War, nor Avarice,
 Nor Luxury were known: but now the race,
 Which evil arts have injur'd, need the help
 Of better art to save. Fair MEDICINE,

Hail, therefore! well the-elevated mind, 495
 The conscientious, independent breast,
 Still vigilant to guard the public weal,
 Restore our violated rights, and give
 The constitution its lost equipoise,
 May venerate thy glories, and assist
 In the high duties of thy chosen band;
 Justly the Patriot, the Philosopher,
 The Friend of human nature, is thy son *!
 Nor, while Oppression from the infernal shades
 Hath called fierce Discord, and in fury sent 505
 The demon forth, rending the happy ties
 Of Love and Bliss; and the destroyer smiles,
 And Population mourns her wasted World,
 Shall the *Humane* * want the unsullied meed
 Of honest praise; wak'd by whose patriot care
 The latent vital spark—though seeming Death
 Hath pour'd her chilly darkness o'er its beam—
 Rekindles: these the Star of Beauty, quench'd
 In the relentless wave, adorns; retriev'd
 To chase Despair, and charm the Lover's soul 515
 With heighten'd lustre: thoughtless Infancy,
 Press'd to the bosom of maternal Love,
 While the transported parent smiles, and weeps,
 And faints beneath the unutterable joy;

* This it is presumed can be in no need of an explanation. The great and liberal Science of Physic furnishes several examples; amongst the brightest of which was the late justly regretted Dr. FOTHERGILL. If I could hope these verses would go down to Posterity, I would say the particular object of this passage was Dr. JOHN JEBB.

* V. note.

And,

And, when reviv'd, scarce thinks the blessing true,
 Shall be the speechless herald of their deeds :
 And the bold mariner, Britannia's boast,
 Shall prove his rescued life a noble gift.
 Ye sons of Knowledge and Benevolence,
 Pursue your glorious toil ; and persevere 525
 To trace the various causes which suspend
 VITALITY ; and point the means which call
 The irritated fibres from the sleep
 Of death-like Torpor ; animate the powers
 Of motion and extinguish'd sense ; revive
 The lost pulsation, and restore the breath,
 Ere yet *Putridity* invade, and seal
 With livid marks the irrevocable doom.
 Let meaner Natures ravage and destroy,
 To save and bless is human Dignity, 535
 The work of *Man*, of *Angels*, and of *God*.
 Attempt we to retrace the mighty WHOLE.

Observe by what gradation Nature's scale
 Ascends* : the floating dust in airy dance
 Upon the sun-beam wafted ; pearly sand,
 And denser gravel, and concreted earth,
 In stony masses harden'd ; rocky spar,
 And dusky ore : thence all the perfect forms
 Of chrystal, gem, and metal. See how fleet
 The vapours, and accumulate to rain ; 545
 The rain to lakes, the lakes to flowing streams,
 The streams to rivers ; rivers turn'd to Seas,

* V. note.

And

And tributary Seas in Ocean lost.
 Mark we the vegetable world's advance:
 The thin green mantle of the sleeping pool;
 The excrescent Fungus, hard to be discern'd
 From the supporting bark, or parent earth;
 The secret flowrets, and the latent seed.
 Next all the gay variety of herbs,
 And flowers obscure of tint, and rude of shape: 333
 Thence perfect in a simple form and hue,
 And thence luxuriant in ten thousand dyes,
 With nameless elegance of structure grac'd,
 Beyond the pencil'd prodigies of art:
 Thence how the pliant matter by degrees
 Hardens to shrubby texture; rises thence
 In dignity of stature, emulous
 Of the superior tree; from annual life
 Exalted to perennial; from the loss
 Of its deciduous honour to the pride: 363
 Of an immortal verdure, crown'd with fruits
 Of beauteous aspect, and delightful taste;
 Or glorying in the vast and solid bulk,
 From whence shall rise the stately edifice,
 Senates of Heroes, and the shrines of Heaven:
 Or naval Terror awe the subject sea,
 Or Plenty, Peace, and Arts, and Happiness,
 Unite the world in fair commercial bond.
 Doubtful if Vegetation not include
 Sense, and the powers of animated Life, 375
 Through all its tribes of Matter organiz'd *,

* Dr. WATSON on CHEMISTRY.

Who shall discern the plant that shuns the approach
Of the invading hand; denying *that*
The name of *sensitive*, while on the rock
Bleeds the attractile *Spung*, allow'd to boast
Its animal existence, and the shore,
Wash'd by the reflux wave, is peopled wide
With shelly habitants of shapeless kind,
In feature nor in limb discernible,
Nor capable of change of place; endued
With neither sight nor smell, since these to them
Were more than useless, a pernicious gift:
Thence more complete the scaly tribes advance,
And swim the flood. See how the finny race,
From the slight Minnow to Leviathan,
Have their proportion'd size and faculties!
How the amphibious class the aquatic joins,
To the terrestrial world! how others link,
Earth to the free inhabitants of the air:
The insect, greater reptile, quadruped,
How each allied to each. Here view the line
Improv'd! How brightens the ascending chain!
Power, Courage, Strength, Instinct, Sagacity,
From Weakness and Timidity emerge.
From the poor mole, the languid sloth, the hare,
To the fierce lordly bull: the elephant,
The dog, the fox, the beaver; till complete
Our World's creation terminate in MAN.
Wide, great, and fair the SYSTEM, which to Man
Stands forth reveal'd in glory. Who shall judge
The infinite, beyond how great, how fair!

These

These are small portions of the Almighty work,
 Whose height, whose depth, Infinity forbids
 To fathom, or by proud ascent explore :
 Nor haply to our station less agrees
 Our ignorance than knowledge *. What is known,
 Suffice it to expand the grateful mind,
 Strengthen the judgment, purify the heart,
 And fill imagination with such scenes,
 That godlike *Reason* may admire her powers, 615
 Nor blush to own her sister : still remains
 The immense unknown to check our vanity,
 And say to Man, ' Thou creature of a day,
 ' Thou restless prisoner of a petty world,
 ' Thou wert not made for speculative pride,
 ' Nor yet for thoughtless indolence : ' to see,
 To think, combine, abstract, great is the field,
 And wide thy province ; howsoe'er confin'd,
 To universal Being when compar'd,
 Perhaps best suited to initiate 625
 Thy infant faculties : but ampler still
 The field of exercise, where *Action* trains
 Thy sensibility of heart ; and calls
 Thy social principles, ordain'd to serve
 In the fair list of VIRTUE : urg'd by whom,
 From all her contemplations, all the scenes
 Of Nature visible, or boundless worlds,
 View'd in idea by Philosophy,
 To follow duty, and obey the heart,
 The genuine Sage retires : inspir'd by these, 635

* V. note.

And not diverted. Does his country need
His service, does her cause demand his life,
He will not linger in his learned ease,
Nor leave one moment the great toil foregone,
To conquer Speculation's proudest height,
And reign supreme in *Science*: whom he loves
As the bright guide to VIRTUE; sent to calm,
Enlighten, and direct the soul; but ne'er
Worships the means neglectful of the end.

Of other worlds what mind but ONE alone 645
Shall note the *Universal Scale*? We view
Their orbs how vast; and Computation finds
No limit to their number: ONE DESIGN,
From the small globe of the attendant Moon
To the remotest Star which art can trace,
ONE simple, perfect, all-preserving LAW
Pervades the *System of Immensity*.
How lovely, how diversified, exceeds
Imagination! what unnumber'd forms
Of matter, life, reason, and intellect! 655
What beauty, what transcendancy of power,
What senses unconceiv'd, and faculties
Beyond the summit of our present being,
Progressive infinitely! still beneath
The high perfection MAN is born to reach,
Rising through ages of eternal life.
O INFINITE of WISDOM, *only King*,
ALMIGHTY! these are thy stupendous works,
This thy unbounded goodness, Sire of all!

A a

Here,

Here, my EUDOSIA, let us pause: and view
 The range which we have made: Observing first 666
 The powers of *Matter*, on the *EARTH* we cast
 Our meditating eye; saw it a *GLOBE*;
 Noted its *annual* and *diurnal* course;
 Beheld how little to the *UNIVERSE*:
 The *ORDER* of the *PLANETS* view'd, and saw
 Their *Distance*, and admir'd their *Magnitude*;
 With awe explor'd the glories of the *FIX'd*,
 And *GRAVITATION*'s *UNIVERSAL REIGN*:
 The laws of *Light* and *Shade*; the varying *Phase*;
 The *Eclipse*, the *Tide*; the *cometary* Orbs; 676
 The powers of *Air*; the laws which *Fluids* own,
 Common to all their classes: thence aspir'd,
 Investigating the *pure Element*
 Of *Electricity*; and last the *Frame*,
 The *Powers* of *MAN*; his *Duty*, *Bliss*, and *End*;
 To cultivate benevolence, and know,
 —As in his works or in his word reveal'd—
 And love, the *INFINITELY GREAT AND GOOD*:
 According with the *philosophic* choir 683
 Of *every age*, and faithful to the voice
 Of *Conscience*, and the impulse of the *Heart*.
 And thus in happy union may we walk
 The allotted space of life: *PHILOSOPHY*
 Divinely charming us in full content:
 And whether *rural Solitude* delight,
 Or if the *crowded Capital* engage,
 Whether fair *Health* her purple wings display,
 Shedding delight and peace upon my head,

Or

Or pale-ey'd *Sickness* o'er my couch extend 695
 Her sable pinions, may she spare at least
 Thy *tender Elegance* of *Form* and *Mind*,
 Thy gentle converse never may I lose,
 My *mild Philosopher*, my better self!

And O! to humanize and bless the world,
 May the high study of great *NATURE's* works
 Prevail; subduing *Ignorance* and *Vice*,
 Adding new grace to *female Loveliness*,
 Attenuating and confirming *manly Worth*;
 Of private bliss and public good profuse; 705
 Bright in *progressive Virtue*, from the dawn
 To the *Meridian*; never to decline,
 Or be thenceforth obscur'd. O come, *great Day*!
 When neither *Pain* nor *Death*, *Error* nor *Vice*,
 Nor *partial Interest*, nor *fancied Good*,
 Shall reign: but purest *Sympathy* and *Love*,
Freedom, and all the *Heaven of social Peace*,
Guile, *War*, and baneful *Tyranny* extinct;
 While *Man*, not slave to local prejudice,
 Shall triumph in the happiness of *Man*, 715
 Wherever plac'd: *Friend* to his *native soil*,
 But *PATRIOT* of the *WORLD*: nor less attun'd
 To the best pleasures of *domestic life*;
Parent and *Child*, and the endearing tie
 Which *Reason*, *Choice*, and *Passion*, and *Esteem*,
 And *Love's* mysterious union closest binds—
Husband: so powerful o'er his soul diffus'd,
 The sense of universal *HARMONY*,

Ecstatic, pure, divine! and selfish pride,
Sordid pursuits, and base, corrupt, delight
So lost, in contemplation of the WHOLE.

723

Thus shall the *renovated Earth* with joy
Confess her *great CREATOR*; and his name
Fill all his worlds with awe and sacred bliss,
Triumphant through the boundless UNIVERSE!

29th Sept. 1780.

725
A R G U M E N T
O F
THE FIRST BOOK.

THE EARTH.

PROPOSITION of the whole Work, v. 1—6. *Invocation to the DEITY*, 20. *Address to EUDOSIA*, 21—40. *The UNIVERSE defined*, 42—4. *Different in the rank and order of its parts; their tendency to mutual destruction and reproduction*, 45—62. *The ELEMENTS*, 62—5. *Probably a modification of simple, primary particles, unknown, and which may be of one sort, or homogeneous*, 65—74. *Reasons in support of this presumption*, 75—84. *MATTER owes its energy to the divine will; being inert in itself without will or action*, 85—92. *Confirmation*, 93—108. *Resistance of Matter and centripetal forces mean nothing that implies activity of Matter*, 109—121. *Order of those great, visible divisions of Matter, which we call the Elements*, 122—142. *Tendency of the united Earth and Water to a Globe*, 145—150. *Confirmation from the phenomena of Sun-rise, Eclipses, and apparent rise of the fixed Stars*, 150—190. *The mountains, relatively, too small to be considered*, 193—202. *Proof from the SEA*, 203—15. *Every drop left free will be spherical*, 216—19. *Thus the whole mass by analogy*, 220—31. *Experimental demonstration*

monstration by the globe having been sailed round,
 with digression on the origin and abuse of commerce,
 and encomium on its use, and praise of COLUMBUS
 and other humane, philosophic navigators, 232—327.
 The atmosphere, 388. Changes in it and the sea,
 407. ANNUAL MOTION of the EARTH round the
 SUN, 408—411. Objections stated and answered,
 412—624. The diameter and circumference of the
 Earth when discovered, and the division of the visible
 circumference of Heaven into degrees, 645—720. The
 Earth a point in comparison of the UNIVERSE, 721.
 Contemplation on the vanity of the excessive human
 pursuits, 779 to the end.

A R G U M E N T
 O F
 THE SECOND BOOK.
 THE PLANETS.

GENERAL Exordium, v. 1—54. Containing the
 praise of Astronomy and of the most eminent astron-
 omers: particularly COPERNICUS, NEWTON, and
 FERGUSON. Division of the Stars into planetary and
 fixed, 55—76. The Motion of the Planets, and the
 apparent Motion of the other Stars, uniform, and
 determined by supreme Wisdom, 76—117. The Num-
 ber

ber and Order of the Planets, Mercury, Venus, the Earth, Mars, Jupiter, Saturn; their distance from the fixed Stars; veneration from hence due to the DEITY; sublimity and use of Astronomy; exhortation to BRITAIN to maintain peace, order, and union by the example of the Heavens, 118—21. PERIODS of the PLANETS in round numbers, 182—92. Apology for the use of these calculations in Poetry, from the Agreement of the Sciences, and the Harmony of the Law, which regulates the periodic times, the squares of which are as the cubes of the distances, with the praise of KEPLER, 192—220. Their distances how investigated, and what; definition of Parallax, and its consequence; Transit of Venus, and encomium on HORROX, 221—335. Reflections on their amazing velocity, and confirmation of the COPERNICAN system, from their periodic times and distances compared, 258—375. Their Rotation of the SUN, 376—409. Their MAGNITUDES how astonishing, 410—427. Panegyric on GEOMETRY and ASTRONOMY, and on the cultivators of those sciences, 430—462. Rotation of the Sun proved by his spots, 462. The causes and variations of Light to the several Planets, the Satellites of some, the ring of Saturn, 485—567. Their densities, and the probable final cause, 568 to the end.

A R G U M E N T O F THE THIRD BOOK.

THE SEASONS, AND THE ZODIAC.

EXORDIUM, proposing the general subject of the book, which is the progress of the Earth in the Ecliptic, the vicissitudes of the Seasons, and their causes; with a commendation of the study of ASTRONOMY, as adapted to every Age and Climate, v. 1—45. Description of the Poles and Circles of the Earth, and correspondent Heavens, 46—131. The ZODIAC, with a digressive panegyric on NEWTON, 135—302. Right, oblique, and parallel positions of the sphere, and meridians, 324—356. The GALAXY, or Milky Way, 357. The temperature and character of the ZONES, and the causes which vary and mitigate the degrees of Cold and Heat: the influence of climate on the persons, arts, laws, and manners; the advantage of the temperate, and striking difference between the Northern and Southern hemisphere, 369—786. The inclination of the Earth's axle to her orbit, the cause of the Seasons, 787—80. If parallel there would be only Spring insufficient to ripen the fruits of the Earth, 797. The progress of the SEASONS, 798—859. Elliptic orbit of the Earth, and the other PLANETS, with effects resulting from hence: and the equilibrium of centripetal and centrifugal forces, 860—916. Conclusion of the third book, 817—22.

A R G U M E N T
O F
THE FOURTH BOOK.

THE FIXED STARS.

WHAT is meant by the rise and setting of Stars, v. 1—43. Right and oblique ascension, 56. Encomium on CHIRON and ARCHIMEDES; names, symbolical characters; number in each constellation of the first and second magnitude, and telescopic; and the total number of the Stars in FLAMSTEAD'S catalogue summed up in round computation, 61—416. Their apparent infinity, owing to their promiscuous arrangement, 417—428. Illustration of their distinct visibility, and inferences from thence, 429—477. A characteristic difference between the works of NATURE and those of ART intimated, 478—84. The phenomena of their Rise, Meridian, and Setting to our part of the globe at mid-winter, 485—550. Correspondence, or Astronomic Geography exemplified, 551—90. Precession of the Equinox; Chronological use, 591—622. Progressive scale of apparent magnitude, 623—638. Real number, distance, and magnitude of the Stars, unknown and inconceivable; reasoning from Observation and Analogy on the Plurality of Worlds; Rotation of certain fixed Stars reasonable to be believed; and arguments drawn from the supposition

B b

position, 638—704. The probability of that sublime hypothesis, which supposes one immense body the centre of the UNIVERSAL SYSTEM, 704—15. Conclusion of this book by an HYMN to the DEITY.

A R G U M E N T

O F

THE FIFTH BOOK.

ECLIPSES; PHASES OF THE PLANETS
AND TIDES.

LIGHT AND COLOURS.

GENERAL Exordium, proposing the subject of the book, and invocation to URANIA, or the heavenly Muse, v. 1—7. Panegyric on PHILOSOPHY, as subduing Superstition, and raising a free and enlightened PIETY; with the vain notions of Antiquity on Eclipses, and the effects of their error, 7—117. Encomium on THALES for his early calculation: and on FERGUSON for his clear account of the Doctrine of Eclipses, and of natural Philosophy in general; his genius and character, 117—171. General theory on the cause of Eclipses, 171—201. The NODES and CYCLE of the MOON, 202—214. Eclipses central, total, or partial, 215—216. The Moon is darkened, but does not disappear in a total Eclipse, and why,

222—224.

222—224. *Solar ECLIPSE*, 230. *Lunar*, 253. *Effects of the Earth's inclined axis and diurnal motion*; and the quantity of the globe shadowed in a solar Eclipse, 265. *Recapitulation*, 270. *The Eclipse at the crucifixion supernatural, and inferences from it*, 279—299. *Annular Eclipse, and its cause*; *Iris and Penumbra, as observed in annular or total Eclipses of the Sun*, 300—326. *Transition to Light and Colours, and some of the general laws of Optics*; intimations concerning the final causes of the prevalence of certain colours above others; with an account of the principles which contribute to the phenomenon of the *Rainbow*, 327—495. *Phases of the Planets, and how they confirm the System of COPERNICUS*; *Harvest Moon and Twilight*, 495—556. *Of the TIDES—principally occasioned by the attraction of the Moon*; why they rise on the opposite and remotest side, as well as on that nearest; why not highest when their immediate cause is in the height, &c. 438. *Their different height in the open Sea and straights, double Tides, and other apparent irregularities how caused*, 557—646. *Tides in the atmosphere, their consequence and use*, 647—657. *Influence of the Moon on the weather and on the human body*, 681. *The false wonders of Astrology exceeded by the real of ASTRONOMY*, 682—9. *Recapitulation of the subjects of this book, and conclusion*, 691—701.

A R G U M E N T

O F

THE SIXTH BOOK.

ON COMETS; THE ELEMENTS; AND
ELECTRICITY.

EXORDIUM; the Comet of 1680 described in its descending orbit, its ascent, Perihelion, and Aphelion, 51. Different velocities of Comets in the different parts of their orbits, and the heat and cold which might be expected from them; Comets are a species of Planets revolving in a very eccentrical Ellipse, but conformed to the laws of all bodies revolving round a center, describing equal areas in equal times: conjectures concerning their destination and use, and how their atmosphere may moderate their heat and cold; the inclination of their orbits and its end, 99—103. The awful consequence for which one may be reserved, 110. Return to our ordinary solar system; contemplation on physical and moral evil, 210—270. General use of the Elements proposed to be considered, 280. AIR how generated; its common properties, uses as a Fluid, and necessity as a Vehicle of Sensation, support of animation and vegetable life, arts, and commerce, 283—331. WATER, and laws of Hydrostatics, 332. FIRE, 414. AIR, considered in relation to Water and Fire, an universal medium,

fruum, and absorbent of noxious effluvia; restored by vegetables in the Sun, when rendered unfit for life; nitrous and phlogisticated Air considered, together with fixed Air; their effects and several uses, 326—428. Transition to the praise of groves, agitated waters, and a rural life; Phosphorus, 540. ELECTRICITY, 563. Successive discoveries in that art; and its medical use intimated; with a particular encomium on the great discovery of the means of conducting Lightning from the clouds, 663. Exhortation to the study of natural Philosophy from its dignity, utility, and suitableness to the nature of Man, 663—676. Earthquakes and other great concussions probably occasioned by Electricity; and the phenomenon of the Aurora Borealis referred to the same cause; which it is attempted to explain, 679 to the end.

A R G U M E N T

O F

THE SEVENTH BOOK.

HUMAN ANATOMY; THE MICROSCOPE;
CONCLUDING RECAPITULATION.

INVOCATION to the heavenly Muse to assist in the
praise of the GREAT CREATOR from his works; the
consent of wise men of profane and sacred Anti-
quity in this application of the wonders of Nature,

V. 1—134.

V. 1—134. *Transition to Anatomy, 135—329. On the Mind of Man, and its Faculties; the dominion he has over the world by the use of them; his observation extended to the inconceivably great and small; from whence occasion is taken to notice the microscopical discoveries, 330—364. General RECAPITULATION and CONCLUSION.*

THE Authors which have been principally used are BUCHANAN de SPHÆRA, from whom part of the Poem is translated; FERGUSON on ASTRONOMY; MARTIN'S PHILOSOPHIA BRITANNICA; LACY on the UNIVERSAL SYSTEM; ADAMS on the GLOBES; PRIESTLY on ELECTRICITY; the last edition of the CYCLOPÆDIA occasionally; and BAKER on the MICROSCOPE.

T A B L E I.

THE following are computations of the superficial magnitude of the Earth and its several parts; together with the supposed *population*, extracted from GUTHRIE, TEMPLEMAN, and other authors. 60 miles are here taken to a degree.

The GLOBE,	199,512,595.
SEAS and <i>uninhabited</i> parts,	160,542,026.
<i>Inhabited</i> and <i>known</i> ,	38,996,569.

Superficial Magnitude in Square Miles.	Relative Magnit.	Population.	Relative to Europe
EUROPE, 4,456,065		153,000,000	
ASIA. 10,768,823	2½. 1	500,000,000	5.4
AFRICA, 9,654,807	2⅓. 1	150,000,000	1.2⅓
AMERICA, 14,110,874	3½. 1	150,000,000	1.3½
		953,000,000	

By this it appears that Asia is the most populous part of the globe; next is Europe; next Africa; and last, at present, America. Supposing, which is fair to believe, that under free governments all the globe might be equally well populated with Asia, and you would have pretty nearly thus,

EUROPE,	—	—	—	200,000,000.
AFRICA,	—	—	—	415,000,000.
ASIA,	—	—	—	500,000,000.
AMERICA,	—	—	—	750,000,000.

1,865,000,000.

One thousand eight hundred and sixty-five millions: or near double the number which it is thought to contain at present.
But

But suppose the *population* through the inhabited globe equal to that of Holland, which is about 2000 for every *thirteen* square miles, and the *total population* of the inhabited earth would be 6000,000,000; or *six thousand* millions nearly. If the arts of peace, and the spirit of equal liberty shall pervade the world, this happy increase of its inhabitants may be equalled or exceeded. Were the present number to double in every half century, as they have been observed to do in British America in twenty-five years, the

Product in 1830	would be	1,906,000,000.
1880		2,812,000,000.
1930		5,624,000,000.
1980		13,248,000,000.

Thirteen thousand two hundred and forty-eight millions; and doubtless this would be the case, and the earth abundantly sufficient to maintain them, were the sword and tyranny at an end. That this would make the earth in process of time too full, is no apology for the mad and cruel injustice of men. Let us do our duty; and whenever the blessings consequent on our acting agreeably to our nature would otherwise degenerate into an evil, Providence has the means of preventing this effect: in the assurance of which our presumption would do better to acquiesce, than to perpetuate misery and guilt, on the pretext that we have not room to leave peace, innocence, and happiness to their progressive operations.

T A B L E II.
The PERIODS, ROTATION, DISTANCE, MAGNITUDE, &c. of the PLANETS for-
merly computed. Taken from FERGUSON.

Annual Period.		Diurnal Rotation.		Hourly Motion in Orbit.	Equato-rial Motion.	Place of Aphelion	Ascend- ing Node.	The Signs.
D	H	D	H	Miles.		° /	° /	
SUN,					3818	° /	° /	♈ Aries.
♄ 1.	Mercury, 17.23	25.	6	95000		♈ 13.8	♄ 14.43	♉ Taurus.
♀ 2.	Venus, 224.17	Unknown.		69000	43	♊ 4.20	♈ 13.59	♊ Gemini.
♁ 3.	Earth, 365.6	1=24	8	58000	1042	♊ 8.1	Variable.	♋ Cancer.
☾ 4.	Moon, 365.6	29. 12 $\frac{1}{4}$		2290	9 $\frac{1}{2}$			♌ Leo.
♂ 5.	Mars, 686.23	24. 40		47000	556	♏ 0.32	♌ 17.17	♍ Virgo.
♃ 6.	Jupiter, 4532.23	9. 56		25000	25,920	♏ 9.10	♏ 7.29	♎ Libra.
♅ 7.	Saturn, 10,759.7	Unknown.		18000		♏ 27.50	♏ 21.13	♐ Scorpio.
		Axis inclined to		Orbit inclined to				♑ Sagittarius.
		° /		° /				♒ Capricorn.
Orbit, 8		D 2.10		Ecliptic, N° 1. 6.54		N° 4. 1.52		♓ Aquarius.
♄ Unknown.		♂ 0.0		2. 3.20		5. 1.20		♊ Pisces.
♀ 75		♂ 0.0		3. 5.18		6. 2.30		
♁ 23.29		Unknown.						

Dist. of each Planet from the next.	Diameter.	Surface in Square Miles.	Cubic Solidity.	Distance of Comets.
Venus, 31,000,000	SUN, 763,000	1,828,911,000,000	B. 232,577,115,137,000,000	1. 1,458,000,000
Earth, 27,000,000	Moon, 2,180	14,898,750	M. 5,408,246,000	2. 2,025,000,000
Mars, 50,000,000	1. Merc. 2,600	21,236,800	9,195,534,500	3. 6,600,000,000
Jup. 349,000,000	4. Mars, 4,444	62,038,240	45,969,335,840	Period.
Sat. 412,000,000	2. Venus, 7,906	191,361,300	258,507,832,200	1. 75 Years.
	3. Earth, 7,970	199,852,860	265,404,598,080	2. 129 do.
	5. Jupit. 67,000	14,102,562,000	155,128,182,000,000	3. 575 do.
	6. Sat. 81,000	20,603,970,000	B. 278,153,595,000,000	
Proportion of Diameters.	Light and Heat.	Quantity of Matter.	Proportion of Bulk.	
SUN, 10,000	45,000	Merc. unkn.	877,650	
Moon, 28 $\frac{1}{2}$	1. + Moon.	Venus unkn.	Jupiter, 1,049	
Mercury, 34 $\frac{1}{10}$	6 $\frac{1}{2}$ Merc.	Mars unkn.	Saturn, 586	
Mars, 58 $\frac{1}{10}$	1 $\frac{1}{4}$ Venus.	Jupiter, 220	Venus, 1	
Venus, 103 $\frac{1}{2}$	1 Earth.	Saturn, 94	Earth, 1	
Earth, 104 $\frac{1}{2}$	2 $\frac{1}{7}$ Mars.	Earth, 1	Mars, 1 $\frac{1}{5}$	
Saturn, 878 $\frac{1}{2}$	2 $\frac{1}{8}$ Jupiter.	Moon, 1 $\frac{1}{10}$	Mercury, 1 $\frac{1}{27}$	
Jupiter, 1,061 $\frac{1}{2}$	1 Saturn.		Moon, 3 $\frac{1}{5}$	

Proport. of Gravity on the Surface.	Mean Diam. as seen from the Sun.	Parallax of Venus, 8".65	
		Old computed mean Distances from the Sun.	New computed mean Distances according to the Parallax.
SUN, 24	6"		
Merc. unkn.	11		
Venus	16		
Mars	20		
Earth,	21		
Moon,	30		
Jupiter,	37		
Saturn,	1 $\frac{1}{2}$		
		Mercury, 32,000,000	Mercury, 36,841,468
		Venus, 59,000,000	Venus, 68,891,486
		Earth, 82,000,000	Earth, 95,173,000
		Mars, 125,000,000	Mars, 145,014,148
		Jupiter, 426,000,000	Jupiter, 494,990,976
		Saturn, 780,000,000	Saturn, 907,956,130
Eccentricity of Orbit.	Would fall to the Sun.	Jupiter's Moons. Period.	
		D. H.	Saturn's.
Mercury, 6,720,000	Mercury, 15.13	D. H. ' 1. 18. 36	D. H. ' 1. 1. 21. 19
Venus, 413,000	Venus, 39.17	2. 3. 13. 15	2. 2. 17. 40
Earth, 1,377,000	Earth, 64.10	3. 7. 3. 39	3. 4. 12. 25
Mars, 11,439,000	Moon, 121	4. 16. 18. 30	4. 15. 21. 41
Jupiter, 20,352,000	Mars, 290		5. 79. 7. 48
Saturn, 42,735,000	Jupiter, 767		
Moon, 13,000	Saturn,		

Dist. of each Planet from the next.	Diameter.	Surface in Square Miles.	Cubic Solidity.	Distance of Comets.
Venus, 31,000,000	SUN, 763,000	1,828,911,000,000	B. 232,577,115,137,000,000	1. 1,458,000,000
Earth, 27,000,000	Moon, 2,180	14,898,750	M. 5,408,246,000	2. 2,025,000,000
Mars, 50,000,000	1. Merc. 2,600	21,236,800	9,195,534,500	3. 6,600,000,000
Jup. 349,000,000	4. Mars, 4,444	62,038,240	45,969,335,840	Period.
Sat. 412,000,000	2. Venus, 7,906	191,301,300	258,507,832,200	
	3. Earth, 7,970	199,852,860	265,404,598,080	1. 75 Years.
	5. Jupit. 67,000	14,102,562,000	B. 155,128,182,000,000	2. 129 do.
	6. Sat. 81,000	20,603,970,000	M. 278,153,595,000,000	3. 575 do.

Proportion of Diameters.	Light and Heat.	Quantity of Matter.	Proportion of Bulk.
SUN, 10,000	45,000	227,500	877,650
Moon, 28 $\frac{1}{2}$	1. + Moon.	Merc. unkn.	Jupiter,
Mercury, 34 $\frac{1}{10}$	6 $\frac{1}{2}$ Merc.	Venus unkn.	Saturn,
Mars, 58 $\frac{1}{10}$	1 $\frac{1}{4}$ Venus.	Mars unkn.	Venus,
Venus, 103 $\frac{1}{2}$	1 Earth.	Jupiter,	Earth,
Earth, 104 $\frac{1}{2}$	3 $\frac{1}{4}$ Mars.	Saturn,	Mars,
Saturn, 878 $\frac{1}{2}$	2 $\frac{1}{8}$ Jupiter.	Earth,	Mercury,
Jupiter, 1,061 $\frac{1}{2}$	9 $\frac{1}{10}$ Saturn.	Moon,	Moon,

Proport. of Gravity on the Surface.		Mean Diam. as seen from the Sun.	Parallax of Venus, 8".65	
			Old computed mean Distances from the Sun.	New computed mean Distances according to the Parallax.
SUN,	24	Moon,	Mercury,	Mercury,
Merc. unkn.		Mars,	Venus,	Venus,
Venus		Saturn,	Earth,	Earth,
Mars			Mars,	Mars,
Earth,	1		Jupiter,	Jupiter,
Moon,	$\frac{34}{100}$		Saturn,	Saturn,
Jupiter,	2			
Saturn,	$1\frac{1}{2}$			
			Jupiter's Moons. Period.	Saturn's.
Eccentricity of Orbit.			D. H.	D. H.
Mercury,	6,720,000	Mercury,	1. 18. 36	1. 21. 19
Venus,	413,000	Venus,	2. 3. 13. 15	2. 17. 40
Earth,	1,377,000	Earth,	3. 7. 3. 39	3. 4. 12. 25
Mars,	11,439,000	Moon	4. 16. 18. 30	4. 15. 21. 41
Jupiter,	20,352,000	Mars,		5. 79. 7. 48
Saturn,	42,735,000	Jupiter,		
Moon,	13,000	Saturn,		
Would fall to the Sun.			D. H.	
Mercury,			15. 13	
Venus,			39. 17	
Earth,			64. 10	
Moon				
Mars,			121	
Jupiter,			290	
Saturn,			767	

Distance of the Satellites of Jupiter and Saturn in Semidiameter of each Planet.			
Jupiter.		Saturn.	
1.	$5\frac{6}{10}$	1.	2
2.	9	2.	$2\frac{3}{5}$
3.	$14\frac{3}{10}$	3.	$3\frac{2}{3}$
4.	$25\frac{3}{10}$	4.	8
		5.	$23\frac{3}{10}$

If the planets are supposed inhabited in equal proportion with the earth, they may contain as follows :

Venus,	-	-	-	950,000,000
Mars,	-	-	-	190,000,000
Mercury,	-	-	-	33,000,000
Saturn,	-	-	-	86,670,000,000
Jupiter,	-	-	-	209,660,000,000
Earth,	-	-	-	953,000,000
				298,456,000,000

And multiplying the number 3000 times for the number of distinct stars in the system, $895,368,000,000,000$; or eight hundred and ninety-five billions, three hundred and sixty-eight thousand millions.

TABLE III.

OF SPECIFIC GRAVITIES.

Taken from FERGUSON'S TABLES.

A cubic Inch	Avoirdupoise.		Compar. Wt.
	Oz.	Dr.	
Of very fine Gold,	11.	5.85	19.639
Standard Gold,	10.	14.88	11.887
Guinea Gold,	10.	4.76	17.793
Platina,			
Quicksilver,	7.	13.16	13.565
Lead,	6.	8.86	11.325
Pure Silver	6.	6.69	11.090
Standard,	6.	1.55	10.534
Copper,	5.	3.33	9.
Plate Brads,	4.	13.31	8.344
Steel,	4.	8.71	7.835
Block Tin,	4.	3.99	7.320
Diamond,	1.	13.35	3.400
Fine Marble,	1.	9.30	2.710
Glass,	1.	7.88	2.579
Alabaster,	1.	2.03	1.873
Dry Ivory,	1.	0.89	1.823
Dry Box-wood,		9.54	1.029
Sea Water,		9.51	1.028
Common Water,		9.23	1.
Red Wine,		9.20	.995
Proof Spirits,		8.62	.931
Pure Spirits,		8.02	.866
Æther,		7.46	.720
Cork,		2.21	.240
Air,		0.009	.001

If the decimal points be taken away from the numbers on the right hand they will become whole numbers, and show how many ounces are contained in a cubic foot in each of the substances in the Table.

An Avoirdupoise ounce contains 437.5 grains,
 ----- drachm 23.24375 ditto

TABLE IV. OF ELECTRICS.

FROM MR. DE BOULANGER,

Beginning with the most imperfect.

FIRST CLASS.

Ebony,	Oak,	Rose,
Guaiacum,	Elm,	Willow,
Box,	Ash,	Ozier,
Sandal,	Linden,	Cork.

SECOND CLASS.

Shells,	Horn,	Wool,
Whalebone,	Scales,	Feathers,
Bones,	Parchment,	Cotton,
Ivory,	Hair,	Silk.

THIRD CLASS.

Alum,	Sandarac,	Celophony,
Sugarcandy,	Mastich,	Sulphur,
Phosphorus of	Amber,	Sealing Wax,
Berne,	Jet,	All Salts of suffici-
Yellow and White	Pitch,	ent consistency.
Wax,	Gum-copal,	All Refins.
Japan Varnish,	Lac,	

FOURTH CLASS.

Loadstone,	Porphyry,	Agates,
Marble,	Jasper,	All opaque, pre-
Slate,	Varnished Earth,	cious Stones.
Free-stone,	Cornelians,	Porcelaine.
Granite,		

FIFTH CLASS.

Jacinth,	Ruby,	Yellow Diamonds,
Opal,	Sapphire,	White Diamonds,
Emerald,	Cats-eye	Glass and Vitrifica-
Amethyst,	Venice and Mus-	tions of Metals.
Topaz,	covy Talc,	

From

From these Tables it should appear, that bodies are electric generally in proportion to their brittleness, transparency, and specific gravity. Glass, which possesses two of these qualities in the most perfect degree, and the third nearly in a mean proportion between gold and water, is accordingly the most excitable, and most perfectly electric. All metals being non-electrics, or conductors, the specific gravity of glass exceeds that of almost all electric substances; even Diamonds being only in the proportion of 3 to 2 above it.

All electrics when heated become conductors, which makes in favour of the hypothesis, that metals and all conducting substances owe this quality to their phlogiston; of which even water is found to be possessed.

TABLE V. COLOURS.

Tincture of Saffron and <i>red</i> Roses, Cyanus, or <i>blue</i> bottle Flowers, and Spirit of Sal Am- moniac coloured <i>blue</i> ,	} GREEN.
Tincture of Violets, which is <i>blue</i> , and Spirit of Sulphur, which is <i>brown</i> , produce	} CRIMSON.
Solution of blue Vitriol with Lixi- vium,	} YELLOW.
Solution of blue Vitriol with Tinc- ture of <i>red</i> Roses,	} BLACK.
Solution of Cyanus and Copper,	RED.
Tincture of Violets and Copper,	VIOLET.
Tincture of Violets & blue Vitriol,	PURPLE.

By the Mixture of colourless	Fluids.
Spirit of Wine and Spirit of Vitriol,	RED.
Solution of Mercury and Oil of Tartar,	ORANGE.
Of Sublimate and Lime Water,	YELLOW.

Colours

Colours communicated to glass by metals melted with it :
the least refrangible, and the most so, in proportion to the
specific gravity of the metals.

Gold,	—	—	—	RED.
Lead,	—	—	—	ORANGE.
Silver,	—	—	—	YELLOW.
Copper,	—	—	—	GREEN.
Iron,	—	—	—	BLUE.

T A B L E VI.
VELOCITY and FORCE of the WIND.

Miles in an Hour, and common Appellation.		Feet in a Second.	Perpendicular Force on 1 Ft. Avoirdupoise.
1.	Not perceptible,	1.47	.005
2.	} Just perceptible,	2.93	.020
3.		4.40	.044
4.	} Gentle, pleasant Wind,	5.87	.079
5.		7.33	.112
10.	} Pleasant, brisk Gale,	14.67	.492
15.		22.	1.107
20.	} Very brisk,	29.33	1.968
25.		36.67	3.075
30.	} High Wind,	44.	4.418
35.		51.33	6.027
40.	} Very high,	58.67	7.872
45.		66.	9.963
50.	A Storm,	73.33	12.3
60.	Great Storm,	88.	17.712
80.	HURRICANE,	117.33	31.488
100.	An irresistible HURRIC.	146.70	49.2

The force of the wind is as the square of its velocity:
and therefore in the last mentioned case the first degree is to
this wind as $30 \times 30 = 900$ to $100 \times 100 = 10,000$ or
as 9 to 100; and the common state of the atmosphere is 1
to 10,000 only to this extraordinary state of agitation.

T A B L E.

T A B L E VII.

The following may serve for a Table of
COMPARATIVE VELOCITIES.

Velocity with which a Body would fall by Gravity, 16 Feet
per Second.

A great Storm of Wind,	— —	1 Mile per Min.
A Cannon Ball, about	— —	8 ditto.
Sound, 1142 Feet per Second, or about		13 ditto.
The Earth in her diurnal Rotation,		17½ ditto.
The Earth in her Orbit, about		950 ditto.
Mercury in his Orbit, about		1580 ditto.
The Comet of 1680, about		14,000 ditto.
Light, 170,000 Miles per Second, 12,000,000		ditto.

Comparative Velocities.

Velocity of a Cannon Ball compared with the Wind in a Storm,	} 8 to	1
To Sound, — — —	8 to	13
To the Earth in her Orbit, about	1 to	120
To Mercury, about — —	1 to	200
To the Comet of 1680, about —	1 to	1680
To the Velocity of Light, about	1 to	1,440,000

A Bullet would be about 25 years in travelling to the Sun; even Light would be above *six* years in reaching the nearest fixed star; Sound above 4,500,000 years, at 7,000,000 of miles per year: and a bullet would take about *nine millions* of years. And it will be found if a ray of light weighed about the $\frac{1}{6000}$ th part of an ounce, that it would have all the effect of a 24 pound ball discharged from a cannon; since the force is always as the weight multiplied by the velocity.

This may be considered in another way. The late dreadful hurricanes in the West Indian islands are too affecting a proof of the violence of agitated air, by which thousands of human beings were destroyed, and whole towns

T A B L E VIII.

The following Extract from FERGUSON'S
ASTRONOMY shews the successive Observations
of FIXED STARS from PTOLOMEY to
FLAMSTED.

	<i>Ptol.</i>	<i>Tycho.</i>	<i>Hevelius.</i>	<i>Flamsted.</i>
The Little Bear,	8	7	12	24
The Great Bear,	35	29	73	87
The Dragon,	31	32	40	80
Cepheus,	13	4	51	35
Bootes,	23	18	52	54
The Crown,	8	8	8	21
Hercules,	29	28	45	113
Lyra,	10	11	17	21
Cygnus,	19	18	47	81
Cassiopeia,	13	26	37	55
Perseus,	29	29	46	59
Auriga,	14	9	40	66
Serpentarius,	29	15	40	74
Serpens,	18	13	22	64
Sagitta,	5	5	5	18
Aquila,	} 15	12	23	
Antinous,				
Dolphin,	10	10	14	18
Horsehead,	4	4	16	10
Pegasus,	20	19	38	89
Andromeda,	23	23	47	66
Triangle,	4	4	12	16
Aries,	18	21	27	66
Taurus,	44	43	51	141
Gemini,	25	25	38	85
Cancer,	23	15	29	83
Leo,	} 35	30	49	95
Berenice,				
Virgo,	32	33	50	110
Libra,	17	10	20	51
Scorpius,	24	10	20	44
		D c 2		Sagit-

	<i>Ptol.</i>	<i>Tycho.</i>	<i>Hevelius.</i>	<i>Flamst.</i>
Sagittarius,	31	14	22	69
Capricornus,	28	28	29	51
Aquarius,	45	41	47	108
Pisces,	38	36	39	113
The Whale,	22	21	45	97
Orion,	38	42	62	78
Eridanus,	34	10	27	84
The Hare,	12	13	16	19
The Greater Dog,	29	13	21	31
The Less,	2	2	13	14
Argo,	45	3	4	64
Hydra,	27	19	31	60
Crater,	7	3	10	31
The Crow	7	4		9
The Wolf,	29			24
The Centaur,	37			35
The Altar,	7			9
Southern Crown,	13			12
Southern Fish,	12			24
	1021	777	1356	2681

NOTES.

N O T E S.

B O O K I.

VERSE 23. See the note on this book, v. 62. and on Book III. v. 32.

V. 69. Sir *Isaac Newton* suggests the opinion, that the elementary particles of Matter probably may be all *uniform* and *homogeneous*. See *Principia*.

V. 91. The negative qualities here ascribed to Matter, agreeably to the Newtonian philosophy, have been called to question by Dr. *Priestly*, whose candour, freedom of enquiry, and abilities, are above encomium. However, all will be true which is presumed on the hypothesis of Sir *Isaac Newton* so far as our subject is here concerned; even if the doctrine in the philosophical disquisitions should be right relative to certain active properties with which Matter is there supposed to be endowed, or at least susceptible of them: for Matter, so far as it is the object of what is usually called physical enquiry, is never found to move or to rest, but in consequence of some external impulse. A like observation may be made with regard to impenetrability, which, whether it be the result of the power of repulsion acting at a distance from the body, or whether it be a primary quality subsisting in Matter, or both in different cases, the consequences in natural philosophy will in general be the same.

V. 194. Of the *relative* proportion of *mountains* to the earth we may judge thus: A mountain of *five miles* height would not equal a *seven hundredth* part of the *semidiameter* of the earth: therefore let the earth be represented by a
ten

ten inch globe, the utmost height of such a mountain above the common surface would be only the *hundred and fortieth* part of an inch; to make it a single inch above the *spherical* superficies the diameter must be $10 \times 140 = 1400$ inches, or *one hundred and sixteen feet eight inches*. Agreeable to this idea is the sentiment of *Dicaearchus*: *vir imprimis eruditus regum cura permensus montes: ex quibus altissimum prodidit Pelion M C C L pass. ratione perpendiculi. nullam esse eam portionem universa rotunditatis*. Plin. L. II. C. 65.

V. 231. Another proof of the *spherical* figure of the earth is derived from the difference between the apparent and the true level.

The distance of the object being one second, which, measured in a great circle upon the earth's surface, amounts to 101 feet six inches and eight tenths, the apparent level will be above the true the three thousandth part of an inch. If the distance be 1 minute, or a geographical mile of 6094 feet, exceeding a common mile by 814; the difference will be 10 inches, 6 tenths, 3 hundredths, and 7 thousandth parts. If one degree or 60 geographical miles equal to 365,640 feet, the difference will be 3191 feet, 9 tenths, 1 hundredth, and 2 thousandths, by *Ferguson's Tables*. Therefore a mountain at the distance of 60 geographical miles, which should seem just level with the horizon, to a spectator on a plane would be of the height above expressed, of 3191 feet; and a person on a plane, his eye five feet and an half above the level, would see somewhat more than two thirds of a geographical mile all round him; if he can see twenty such miles every way, he may then be assured he is placed 354 feet and an half above the level.

From these principles, and the law of optics, by which objects seen under an angle of less than one minute cannot be distinctly perceived, the surface of the *terraqueous globe* does not differ sensibly from a plane; unless an extent be open to the view of at least two miles and a quarter. A ship seen at this distance from the shore will begin to disappear, in consequence of the common convexity of the great mass of earth and water, in the manner mentioned. See *Martin's Phil. Brit. vol. I.*

The

The rotundity of the earth, and the probable existence of antipodes, is affirmed by that elegant writer, and acute philosopher, the Elder *Pliny*. V. L. II. C. 64, 5, 6.

V. 274. The application of the *magnet* to the *mariner's* needle and *compass*, which produced so eminent a change in the relative state, knowledge, manners, and circumstances of the different inhabitants of our globe is rather uncertain (agreeably to the fate of most other important discoveries) both as to the *time* and *author*. It is usually ascribed however to a *Neapolitan*, named *Gioia*; and the *era* fixed to about 1302.

V. 340. COLUMBUS, the discoverer of AMERICA, though *Americus Vesputius* robbed him of the title, died in 1506, at the age of 64. *Priestly's* Biogr. Chart. A full and most interesting account is given of this great man in *Robertson's History of North America*.

V. 362. MAGELLAN, an illustrious Portuguese navigator, was unhappily for his country shipwrecked in 1520.

V. 377. ANSON, this eminent navigator, and in various respects distinguished character, died in 1762.

DRAKE Sir FRANCIS, one of the very few whom *Elizabeth* condescended to honour with any title, died the 28th of January 1595, aged 50.

Captain JAMES COOKE was born at Marton in the county of York, and christened there November 1728. His father was a fisherman, and sent his son to live with a grocer; but the lad disliking his situation bound himself apprentice to a collier, and thence entered into the navy before his indentures were expired.

Near the expiration of the reign of the late king, when merit was the recommendation to military rank by sea or land, he received his commission as lieutenant, April 1, 1760.

In the year 1765 he was deputed by Sir *William Burnaby* from the Jamaica station to *Merida*, the capital of the province of *Yucatan* in the Spanish West Indies, on dispatches of importance relative to the logwood trade.

In

In 1767 the Royal Society recommended that proper persons should be sent to observe the then-approaching transit of Venus, and by the advice of Captain *Wallis* the island of *Otaheite* was appointed for the place of observation. The *Endeavour*, which had been built for the coal trade, was thought fit to be put into commission for this important voyage, and *Cooke* was advanced to the rank of captain on the 25th of May 1768.

He commenced his voyage the 30th of July, and arrived at the place of destination, accompanied by *Joseph Banks*, Esquire, and Dr. *Solander*, on the 13th of April 1769. After the transit had been observed, he went on discoveries, and several new islands are added to the representation of the globe by his means: mutual benefit to commerce, and the improvement of human society, with the increase of happiness, might be promoted by such researches, if we could quit the unphilosophical and impolitic idea of a supposed acquisition of such places on the pretended idea of occupancy, which has no foundation where countries are already inhabited. He proceeded to New Zealand, and on the 10th of October 1770 arrived at Batavia. He reached the Cape of Good Hope (which by our present unnatural rupture with the Dutch is likely to be a place of danger, not of rest and hospitable reception to English vessels) on the 15th of March 1771, anchored at St. Helena on the 1st of May, seventeen days after he had left the Cape, and returned to the Downs, having surmounted incredible difficulties and perils, on the 12th of June 1771.

On the idea of a Southern continent to be discovered, Captain *Cooke* went out with the command of the *Resolution*, and accompanied by Captain *Furneaux* as commander of the *Adventure*. They sailed from Deptford on the 9th of April 1772; but in place of land discovered an immense continent of ice, stretching in the direction of South-east round by South to West. He returned to England on the 14th of July 1774, having in three years and eighteen days navigated all the climates from *fifty-two* degrees North to *seventy-one* South, with an *hundred and eighteen* men, of whom he had the singular felicity and merit to lose but *ONE*, and him too consumptive before he came on board.

In July 1776 the discovery of a North-west passage being renewed in speculation as a point that might be practicable, and, if capable of being executed, evidently of great importance, Captain *Cooke* sailed on this voyage, the offer of his services having been embraced with that satisfaction, which was due to his experience, penetration, zeal, and activity.

After passing by the Cape he continued his progress along Diemen's land and New Zealand. In August 1777 he arrived at Otaheite; quitted that island in December; made other considerable discoveries in the South Seas, and came in March 1778 to that part of America situate near the Southern coast of Kamskatcha. Proceeding with unabated ardour in pursuit of the wished discovery, he had the disappointment of meeting with an impenetrable barrier from the frozen sea in $70^{\circ} 45'$ Latitude, 198° Longitude; thence steering South he anchored near the island Unalaska, which he places in $53^{\circ} 55'$ Lat. $192^{\circ} 30'$ Long. Still warm in the ambition of disclosing new portions of the globe, his desires were gratified by the sight of several islands, which appeared of unusual fertility, and where he hoped to pass the autumn and winter in a situation more propitious to the health and comfort of his crew, and beneficial to the commerce and philosophy of his country. At one of these, named Owhyee, in the gulph of Caracah-cossa, he was received with all the marks of homage and veneration. After he had refreshed his people, one only of whom had died, and two been taken ill in the voyage, he was again under sail, when a furious storm drove him back, and compelled him to spend some time in refitting. The islanders now familiarized, and freed from their awe, stole one of his boats. Captain *Cooke*, with his lieutenant and ten or twelve of his crew, went on shore on the 14th of February 1779 to demand justice; advanced to a large body of the islanders, who treated him with peculiar respect; and commenced a conference with their chief. During which, the behaviour of one in this assembled multitude was so violent, that he thought it necessary to the honour and security of his small party to suppress it by the discharge of his musquet loaded with small shot, which did not pierce the mat with which

E c

they

they cover their bodies. The Indians more enraged than intimidated, boldly came on to revenge their comrade; the lieutenant at length fired, and killed one of them, when the whole troop fell on the sailors, and before they could re-load after the first discharge, Captain *Cooke* with *four* of his crew died by their hands, and the rest partly wounded were compelled to escape.

Captain *Cooke* left several children, upon whom a pension is settled by the crown of £25 each, and £200 per annum on the widow. His best eulogium is contained in an *oration* made by Sir *John Pringle* on the 30th of November 1776 before the Royal Society, which had voted to him, absent, the gold med. l of Sir *Godfrey Copley*, as a reward for his method of preserving the health of his ship's crew transmitted in an account to that illustrious body. The honorable president after observing how meritorious that person must appear, who had made not only the most extensive, but most instructive voyages, discovered and surveyed vast tracts of coast, dispelled the illusions of a terra australis incognita, and ascertained the limits of the habitable earth and navigable ocean of the Southern hemisphere, proceeded to that nobler title to esteem and honour, which had induced the Society to vote the medal. And having commented on the propriety and experienced efficacy of the means employed for the preservation of the sailors health, he concluded thus: Allow me then, gentlemen, to deliver this medal, with his unperishing name engraved upon it, into the hands of one, who will be happy to receive that trust, and to hear that this respectable body never more cordially, nor more meritoriously bestowed that faithful symbol of their esteem and affection. For if Rome decreed the *civic* crown to him who saved the life of a single citizen, what wreaths are due to that man who, having himself saved many, perpetuates in your transactions the means by which Britain may now on the most distant voyages save numbers of her intrepid sons, her mariners? Who, braving every danger, have so liberally contributed to the fame, to the opulence, and to the maritime empire of their country.

See the Westminster Magazine, Jan. 1780.

A circular letter was published after the death of this great discoverer, but before that melancholy event could be known

known in Europe, which does honour to the present king of France.

Paris, March 19, 1779.

M. de Sartine, minister of the marine department, has wrote the following circular letter to all captains of armed vessels, privateers, &c.

Captain *Cooke*, who sailed from Plymouth in July 1778 on board the *Resolution*, in company with the *Discovery*, Captain *Clarke*, in order to make some discoveries on the coasts, islands, and seas of Japan and California, being on the point of returning to Europe; and as such discoveries are of general utility to all nations, it is the king's pleasure that Captain *Cooke* shall be treated as a commander of a neutral and allied power; and that all captains of armed vessels, &c. who may meet that famous navigator, shall make him acquainted with the king's orders in that behalf: but at the same time let him know, that on his part he must refrain from all hostilities.

V. 360. The reader who would see very curious and singular observations relative to the *Milky Way*, will possibly be not ill-rewarded if his curiosity should lead him to consult *WRIGHT's Theory of the Universe*. Ann. Reg. 1779.

V. 396. The moral and physical imbecillity of the natives of the East Indies surely ought to be their shield, not only in the eye of humanity, but even of *ambition*.

V. 543. The progressive *rarefaction* of the atmosphere is thus expressed in the subjoined Table

At seven miles high the air is calculated, on a mean, to be rarefied *four* times more than on the surface, and so in geometric progression;

14	—	—	—	—	16
21	—	—	—	—	64
28	—	—	—	—	256
35	—	—	—	—	1,024
42	—	—	—	—	4,096
49	—	—	—	—	16,384

B. M.

and at 140 miles, 1,096,511,627,776:

E e 2

from

from whence the calculation proceeds, that a *cubic inch* of our air would be so rarefied at the height of 500 miles, as to fill a sphere equal in *diameter* to the orbit of *Saturn*.

V. 565. The velocity of the *stars*, if the earth is at rest, and the starry Heavens move round her, must be so great, as to exceed seven billions of miles an hour: which would be near ten thousand times the velocity of light itself. Some perhaps will think the rotation of the earth to be intimated in the Hebrew word, *צִיָּא*, supposed to be derived from the verb *צָוָה*, expressive of a swift, whirling motion. Sed hæc utcunque æstimata, haud equidem in magno ponam discrimine.

V. 597. Of the magnitude of the *Earth*, see Table II.

V. 602. The author is in possession of a letter from Mr. *Ferguson* to the *Eudofia* of the poem, on the agreement of the *Newtonian* system with the *Mosaic* account.

V. 780. Upon this subject the philosophic genius of some of the finest writers of antiquity has exerted itself in moral and pathetic exclamations. Thus *Pliny*:

Oceanus toto circumdatus medio, et omnes cæteras fundens, recipiensque aquas, quo tandem amplitudinis spatio credatur habitare? Adde quod ex relicto plus abstulit cælum. Nam cum sint ejus quinque partes quas vocant Zonas, infesto rigore et æterno gelu premitur omne quicquid est subiectum duabus extremis. Perpetua caligo utrobique et maligna ac pruina tantum albicans lux. Media vero terrarum exusta flammis cominus vapore torretur: circa duæ tantum, inter exustam et rigentes, temperantur. Ita terræ tres partes abstulit cælum: oceani rapina in incerto est. Addantur et lacus et stagna: jam elata in cælum et ardua aspectu quoque juga: jam sylvæ, vallesque præruptæ, et solitudines, et mille causis deserta detrahantur. Hæc tot portiones terræ: imo vero ut plures tradidere mundi punctus (neque enim est aliud terra in *Univerſo*) hæc est materia gloriæ nostræ; hæc sedes: hic honores gerimus; hic exercemus imperia; hic opes cupimus; hic tumultuatur humanum genus: hic instauramus bella etiam civilia mutuisque cædibus laxiorem facimus terram. Et ut publicos gentium futores

furorē tranſeam, hæc in qua conterminos pellimus furtoque vicini cespitem noſtro ſolo affodimus; ut qui latiffime rura metatus fuerit ultraque fines exegerit accolæ quo terrarum parte gaudeat? vel cum ad meſuram avaritiæ ſuæ propagaverit quam tandem portionem ejus deſunctus obtineat. *Hiſt. Nat. L. II. C. 69.*

There is a fine, though exaggerated and miſapplied deſcription given by *Lucretius* on the ſame ſubject:

— Quantum cœli tegit impetū ingens
Inde avidam partem montes ſilvæque ferarum
Poſſedere; tenent rupes vaſtæque paludes
Et mare quod late terrarum diſtinet oras.
Inde duas porro prope partes fervidus ardor
Affiduusque geli caſus mortalibus aufert.
Quod ſuperest arvi tamen id natura ſua vi
Sentibus obducat ni vis humana reſiſtat.

LUCR. L. V.

To the ſame effect *Cicero* expreſſes himſelf in that exquisite performance, the *Somnum Scipionis*.

Vides habitari in terra rares atque anguſtis in locis: et in iſtis quaſi maculis ubi habitatur vaſtas ſolitudines interjectas. Sentio te ſedem hominum ac domum contemplari: quæ ſi tibi parva, ut eſt, ita videtur, hæc cœleſtia ſemper ſpectato; illa humana contemnito.

V. 781. The proportion of ſea to land is ingeniouſly aſcertained by *Dr. Long*, by taking the papers of a large terreſtrial globe; and weighing the reſpective parts which repreſent each, on a *Senex's* ſeventeen inch globe, the ſea papers weighed 349 grains, and the land only 124.

B O O K II.

VERSE 20. PYTHAGORAS. This distinguished teacher of natural and moral philosophy, who gave the great principles of the modern astronomy to his country, died 497 years before *Christ*, at the age of 71.

V. 21. COPERNICUS was born in the year 1473 at *Thorn* in *Prussia*. He is justly characterized by *Kepler*, who merited the same encomium, thus; “*a man of vast genius, and what is of great moment in these matters of a free mind.*”

He made his great discovery, of the *Sun* being the centre of our system, and the earth revolving round it, about the year 1500; but was very slow and reluctant in publishing it. This he did not till 1543, and saw the first copy but a few hours before his death, which is thought to have been accelerated by the too just expectation of injurious treatment in that dark age, whose intolerant malignity barred the access to every province of knowledge and happiness with censures, contumelies, anathemas, confiscations, imprisonments, and death.

V. 31. NEWTON. This prince of revived philosophy was born in 1642, and died in 1727. Vide note on B. III. V. 247.

V. 32. JAMES FERGUSON was born in the year 1710, a few miles from the village of *Keith* in *Bamffshire*, in the North of *Scotland*. He learned to read, as he made his great advances in subsequent knowledge, almost literally without instruction. Between *seven* and *eight* years old he drew his idea of *mechanic* powers from an accident, which obliged his father to use a lever in supporting the roof of his little cottage. He then went to keep sheep for *four* years, and next served with a farmer, whose name was *James Glasban*, whom he commemorates for his kindness
and

and indulgence. Before he went into this service he learnt the practice of marking the position of the *stars* with a thread and bead; which he there was enabled to continue by the goodness of this honest man. Mr. *John Gilchrist*, minister of *Keith*, encouraged and assisted the growing genius of the lad: and when his service was ended (for he would not leave his master before, though a substitute was offered) *Thomas Grant*, Esquire, received him for instruction into his family, where the butler of this gentleman, *Alexander Cantley* (of whose extensive abilities and knowledge an extraordinary account is given by our philosopher) became his tutor. Of him he learnt decimal arithmetic, *algebra*, and the elements of *geometry*; and from the description of the sphere, aided with a map of the earth, made a *terrestrial globe*; an instrument he had never seen.

He then went into two very hard services, one of them to a miller, and had nearly perished by ill health and want of assistance, had it not been for the medicines and care of his valuable friend *Cantley*. When he was still too weak for labour he made a *wooden clock*, and afterwards a *watch*, from the casual sight of one.

His ingenuity introduced him to Sir *James Dunbar*. Here he learnt to draw, and soon succeeded in this new branch, so as to be considerably encouraged in the portraits which he took without the aid of a master. The Rev. Dr. *Keith* of Edinburgh encouraged his efforts, and recommended him to the patronage of Lady *Jane Douglas*, of whose beauty and merit he speaks in the most affecting language of native simplicity, which was always his language. Here he began to be the *æconomist* of a little stock which the good-will of his friends enabled him to acquire.

He then made some attempts in the medical line; but honestly laid them aside soon, not venturing far in an employment to which experimental knowledge is no less required than genius, and where the consequences of error are so fatal.

In his *twenty-ninth* year he married. And when *thirty*, with very scanty data, and hardly any means from books or instruments to assist him, he invented that excellent machine for shewing the *new moons* and *eclipses*, called his
astro-

astronomical rotula, which acquired him the friendship of that admirable philosopher and good man, Mr. M'Laurin. By sight of an *orrery*, though its machinery was concealed, he made a *tellurian* for the motions of the earth and moon; and gave his first lecture on its use by the desire of his "great and good friend," as he justly calls him.

In 1743 he made another orrery, soon after purchased by Sir Dudley Rider, so eminent for his professional and general abilities. After this by a letter of recommendation from Mr. Baron Edlin of Edinburgh, he was made acquainted with the Honorable Stephen Poyntz, the friend of Lord Lyttleton, and of virtue, whom he mentions with the warmest gratitude and merited veneration. Afterwards a delineation of the complex line of the moon's motion recommended him to the notice of the Royal Society, and particularly of Mr. Ellicot, who had before made a similar scheme, and ingenuously acknowledged his equal title to the invention.

About 1752 he made his astronomical instrument for shewing the rising and setting of the sun, moon, and stars; having published his dissertation on the phenomena of the harvest moon about five years before (in 1747) and read his first course of lectures about the year 1748.

He had encouragement, which his modesty thought more ample than it appeared to those who could best judge of his merit, from various respectable characters; and received a salary of fifty pounds a year from the present king.

In the year 1773, the 63d of his age, he published select mechanical exercises, with an account of his life, from whence this note is taken; his introduction to electricity had been published in 1770, his introduction to astronomy in 1772, and an expression in a letter of his, relative to that work, has occasioned the name of EUDOSIA being appropriated, as he wished it might have been. His great work, "Astronomy explained on Sir Isaac Newton's Principles," had gone through four editions in the year 1770. His lectures on select subjects in mechanics, hydrostatics, hydraulics, pneumatics, and optics had deservedly attained to a fifth edition in the year 1776.

His last published work was a treatise on Perspective, in the year 1775.

In

In the year following, on the sixteenth of November, he died, having struggled with a constitution naturally infirm longer than could have been reasonably expected.

His only daughter was lost in a very singular manner about the age of eighteen. I have heard from my friend Mr. *Walker*, the lecturer in experimental philosophy, that this daughter was remarkable for the elegance of her person, the agreeableness and vivacity of her conversation, and in philosophical genius and knowledge worthy of such a father.

He has left a son, Mr. *Murdoch Ferguson*, now in the navy, who shows a filial regard to his memory.

Some manuscript tables, diagrams, and a philosophical correspondence of this heaven-taught philosopher, are in my hands; which were given by him to my EUDOSIA before our marriage: for he had no pupil whose genius and disposition he more esteemed than hers; nor can I reprove myself for the pride which I often feel in reading over his letters to Miss *Emblin*, written to her before our marriage.

V. 68. Vide note on the first book. It is obvious that the revolution of our earth will have the same appearance to a spectator placed upon it, as a real revolution of the starry Heavens. Vide Book I. v. 427, &c.

V. 182. See Table II.

V. 218. The law here expressed was discovered by *Kepler* on the 13th of May 1618.

V. 274. HORROX, JEREMIAH. This distinguished genius was born about 1619.

V. 279. HALLEY, EDMUND. This eminent astronomer, and great mathematician, was born in 1656, and died at the age of 86.

It has been supposed the planets may influence our atmosphere; but in general this effect must sure be very inconsiderable; as will be seen in the note on Tides: still less need we fear their effect in disturbing our gravitation and order in the system. Suppose, for instance, the quantity of matter in *Venus* to be fifty to one of that in the *Moon*: but the distance of the Moon from the Earth is about 60

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semidiameters of the Earth; or about 240,000 miles. Now gravitation is in the ratio of the quantity of matter directly, and the squares of the distances inversely; and Venus is about 21,000,000 miles distant from the Earth. If therefore the Moon and Venus contained an equal quantity of matter, then this influence would be as 24 square to 2400 square; or as 576 to 5,760,000 = 1 : 10,000 : but on the supposition it is fifty times greater, or as 1 to 200, the influence of Venus therefore will be about the $\frac{1}{200}$ th part of that of the Moon.

Let Jupiter be allowed to contain 50,000 times as much matter as the Moon: but his distance is above 1600 times greater: and consequently his gravitation, if both were equal in quantity of matter, would be as 2,560,000 to 1: but by compounding the difference of bulk it will come out as 1 to 50; but in reality is not more than as 1 to 250; the density of Jupiter being about five times less than that of the Earth.

V. 405. This proportion by the theory of Sir *Isaac Newton* is that of 230 to 229; and the centrifugal force increasing in the duplicate ratio of rotation, the same great author from thence collects, that the equatorial diameter of Jupiter is to his polar axis in the ratio of 9 to 8 nearly; consequently by Table II. the polar axis will be more than 7000 miles shorter than the axis of the equator in that planet. Vide PRINCIP. L. III. Prop. 19. Probl. 3.

The density of the planets is investigated by a method to which the book last quoted referred, depending on the times of revolutions compared with the bulk and distance: and the gravitation is as the cube of the diameter, or quantity of matter, directly, and the square of the diameter, or bulk, inversely. Conf. viii.

B O O K III.

VERSE 31. TYCHO BRAHE was a native of Denmark. He flourished in the year 1601.

His system is *Semi-Ptolemaic*. He had discovered from accurate observations, that the Sun was necessarily the *centre* of the planetary motions; but he makes the Earth quiescent with the Sun, and other planets annually carried round it: so that with him the Sun is only a primary planet to our Earth, and Saturn, Jupiter, and the rest our secondary planets: and rejecting the diurnal rotation of the Earth he was compelled to adopt the enormous improbability, or rather contradiction, of supposing the whole Universe to revolve daily about the Earth.

V. 38. PTOLOMEY, mathematician, geographer, and astronomer, died 161 years after *Christ*, at the age of 78. His system makes the earth the centre of the universe, the sun and all the planets revolving round it.

V. 157. This circumstance shews that the *annual parallax* of the earth is to common observation insensible; and consequently that the difference of the opposite points of an orbit, whose diameter is 190,000,000 miles, makes no alteration in the apparent distance of the *fixed stars*; or, in other words, that the *Magnus Orbis* is a *point* to the *Universal System*.

V. 499. HENRY, prince of *Portugal*. The young hero of navigation is represented in glowing and just colours by Dr. *Robertson* in his *History of North America*; and by Mr. *Mickle* in the elegant dissertation prefixed to his *Lusiad*. He was of a genius and temper that would have done honour to the most enlightened, and the most virtuous days.

V. 503. LEWIS IX. of *France*, whom *Voltaire* has introduced with singular propriety as the tutelary genius of his immortal *Henriade*.

V. 713. *Hudson's Bay* has derived its name from the enterprizing Englishman, who in 1607 made his *first voyage* thither; and in 1611 was forced with eight of his officers, by the mutiny of his crew, into a boat which they left to drive at random; and thus perished in the bay after having thrice before visited it. From the *point* of the bay nearest *Canada* to the *straits* comprehends about 10 degrees, from 51 to 61 North latitude. The longitude is about 75 degrees West.

The influence of climate upon arts, manners, laws, and constitution, and the peculiar advantages of the temperate Zone in all these respects, is finely represented in the grand detail, and elegantly particularized, in a work which I have had the pleasure to see in manuscript, and which will shortly be published, entitled, *Remarks on the influence of climate, situation, nature of the country, nature of food and way of life, upon the disposition and temper, manners and behaviour, intellects, laws, and customs, form of government, and religion of mankind.* By WILLIAM FALCONER, M. D. F. R. S.

It may in no small degree be ascribed to this natural connection of all arts and sciences, that in some illustrious periods they have flourished all at once. Thus between the years 500 and 300 before our Saviour flourished, in Poetry *Pindar*, *Simonides*, *Anacreon*, *Æschylus*, *Euripides*, and *Sophocles*. The fire, the tenderness, the graces, the perfection of that enchanting art were thus manifested in the same æra. Within this period the writers of elegant and refined comedy, *Menander* and *Philemon*, graced the Attic theatre. Eloquence had the simplicity of *Lysias* to boast; the highly adorned beauties which distinguish the composition of *Isocrates*; the grandeur of *Lycurgus*; the energy and art of *Æschines*; and all the combined powers of genius and nature in her immortal DEMOSTHENES. History had the graceful dignity of *Herodotus*; the polished elegance of the amiable *Xenophon*; the nervous conciseness and sublimity of *Thucydides*; moral Philosophy her divine *Socrates* and the admirable *Plato*: Physic her HIPPOCRATES. Sculpture and Painting gloried in *Phidias*, *Polycletus*, *Euphranor*, *Myron*, *Lysippus*, *Zeuxis* and *Apelles*: and active Life in

in *Aristides*, *Agésilas*, *Phocion*; *Leonidas*, *Themistocles*, *Pericles*; the excellent *Timoleon*, the never sufficiently commended *Epaminondas* (and in Roman history *Cincinnatus*, *Decius*, *Fabricius*.) In ASTRONOMY and MATHEMATICS METON, EUDOXUS, ARCHYTAS, and EUCLID were distinguished to the perpetual benefit of the species. What a splendid cluster adorns the Roman history in the two following centuries: *Regulus*, *Duillius*, *Marcellus*, *Fabius Maximus*; the three *Scipios*; *Æmilius* and *Flaminius*; the Elder *Cato*, and those two glorious martyrs to the cause of the Roman people, and the rights of humanity, the Two GRACCHI. CICERO was born, and LUCRETIVUS—not inferior to any of the Roman poets in diction, versification, and imagery—rising into existence.

Between the years 1500 and 1700 in Poetry have appeared *Ariosto*, *Tasso*: the great and inventive genius of CAMOENS, *Moliere*, *Cervantes*, *Racine*, *Fenelon*, *Corneille*; SPENSER, *Cowley*, *Dryden*, SHAKESPEARE, and MILTON: and as distinguished in the successful imitation of antiquity *Vida*, *Fracaſtorius*, and *Buchanan*. In Painting *Holbein*, *Tintoret*, *Reubens*, MICHAEL ANGELO, *Leonardo da Vinci*, that almost universal genius, *Rembrandt*, and *Guido*; VANDYKE and RAPHAEL. In History, Politics, and Metaphysics THUANUS, MACHIAVEL, *Guicciardini*, *Rapin*, *Vertot*, *Puffendorf*, *Grotius*, *Harrington*, SYDNEY and LOCKE. In civil life *Gustavus Vasa*, *Francis the First*, *Charles the Fifth*, *Henry the Great* of France, our own *Elizabeth*; *Cortez*; *Leo the Tenth*; *Sixtus Quintus*; *Cromwell*; PYM, HAMPDEN; VANE; LUDLOW; SYDNEY, alike illustrious in active as in speculative life; *De Ruyter*, the two gloriously unfortunate *De Wits*; *Blake*; TURENNE; *Montecuculi*; MARLBOROUGH, and that finished general and hero, the Earl of PETERBOROUGH; the Prince of ORANGE: *HALE*, *HOLT*, and *SOMERS*, those glories of our laws, and of human nature. In Architecture JONES and WREN. In Music LULLI, GEMINIANI, and PURCELL; the early part of the life of *HANDEL* falls likewise within this period. In experimental PHILOSOPHY and MATHEMATICS *Bacon*, the great luminary who opened the sure and

and direct track to science; the sagacious and excellent *Boyle*; the acute *Descartes*; COPERNICUS, Brahe, HUYGENS; Napier, without whom modern astronomy would have wanted an essential instrument of her vast computations; *Galileo*, who extended her views by the invention of the telescope; Cassini, Leibnitz, the Marchioness du CHATELET; and to close the illustrious train, NEWTON, whose name is praise. Thus while within this period the commanding spirit and penetrating mind of LUTHER and CALVIN broke the way to the Reformation, the strength of genius kept pace with the strength of soul which distinguished those calamitous, but illustrious days: *Servetus*, *Gesalpinus*; HARVEY, the great demonstrator of the circulation of the blood; *Torricelli*, the inventor of the barometer; *Guericke*, of the air pump; *Lieuwenhoek*, of the microscope, opened new worlds, in which human knowledge might expatiate with unbounded delight, and not inferior utility. The time would fail me if I should enumerate a small part of the discoveries of *Borelli* on the laws of motion and muscular force, or give a faint idea of the important labours of the invaluable *Sydenham*, *Willis*, *Friend*, and BOERHAAVE; *Malbranche*, *Ray*, *Pascal*, *Wilkins*, *Molineux*, BARROW, WALLIS, CUDWORTH, *Chillingworth*, *Wollaston* *, and CLARKE croud upon the aching sight, which, wherever it turns, is surrounded with visions of philosophic glory, and sees MONTESQUIEU appearing in the horizon, that nothing may be wanted to fill the majesty of this august scene. There is an excellent observation how nearly allied the sciences are to each other in M. BAXTER's *Matho*, a work extremely adapted to fill the imagination, exercise the reason, and improve the heart. Vol. II. Conf. x.

* The Author of the Religion of Nature delineated.

B O O K IV.

VERSE 81. **CHIRON.** Sir *Isaac Newton's* chronology refers to this philosopher on the evidence of ancient writers, as the first inventor of the *asterisms*, or *constellations*. This illustrious author, and Mr. *Martin* in his valuable work the *Philosophia Britannica*, reduce, with great plausibility, the several delineations of the antient celestial globe to the *Argonautic* expedition. On the other side Mr. *Bryant's* celebrated essay appeals to the learned world. At this time, perhaps at any other, it is not for me to arbitrate the competition: but as the expedition of the *Argonautic*, supposing it to have existed, appeared less suitable to my purpose, than the allegorical interpretation which has been given to some of the signs, particularly those of the *Zodiac*, I have adopted the latter as more poetical, without affirming it to be more true.

V. 90. ARCHIMEDES, a strenuous defender of his country against the Roman power under one of their greatest generals, *Marcellus*, was slain, much against the will of that benevolent hero, as he was engaged in a *mathematical diagram*, and not at leisure to answer the soldier who had orders, in common with all the army, to save his life, and treat him with all possible respect if he could be discovered. His works of pure geometry are, in part at least, preserved, and held in particular respect by the greatest modern mathematicians for depth and sagacity of invention, elegance of method, and *simplicity*. His mixed geometry, as connected with *physics* and *mechanics*, seems to have distinguished him in a manner yet more important. In that famous siege he was considered as a new *Briareus*: near or at a distance; by land, or on the sea, he was the same; the vessels, the batteries, the army of the besiegers were every moment harassed by new methods of attack from his inexhaustible genius and unwearied zeal: and so terrible were the

the effects produced by causes apparently simple, or even despicable, that at last a piece of timber, or a rope let down from the walls, was seen by these intrepid assailants with consternation, as the prelude of some new prodigy, from an hand which they considered as more than human; to sink their fleet, and to overwhelm their legions. Thus nobly he lived, and died happy in not surviving the ruin of that beautiful and glorious city, over which the humane and enlightened conqueror wept; less honoured by all its magnificence, than in having been the parent of so wise and virtuous a citizen; whom yet a few years after his decease his enslaved countrymen had forgotten: and *Cicero*, when engaged in his truly honourable quaestorship in *Sicily*, rarely imitated by antient or modern governors of a province, discovered to them the humble tomb of this great man overgrown with brambles, and characterized by the simple, but expressive distinction of the figure of a *sphere*, with a *cylinder* inscribed; the relative proportion of which he had demonstrated. *Syracuse* was taken in the year 608 of Rome, and this event happened no more than *seventy* years after.

V. 174. The SWAN has been probably in all ages, and in every country, where taste and elegance have been cultivated, the emblem of poetical dignity, simply and unaffectedly majestic. The equal flow, the perfect symmetry, the purity, the genuine graces and pathetic elegance of diction, sentiment, and composition which distinguish the prince of Roman poets, have appropriated to him the epithet of the *Mantuan Swan*.

V. 391. The *air pump*, like several other important discoveries, appears to have been concurrently the invention of the two great names to which it is referred in the poem, independent of conference with each other: at least BOYLE carried his improvement and application of it so far, that he may be considered the inventor, as he deserves to be esteemed the father of the important science of *pneumatics*, and the first example of the successful and philosophic use of experiment recommended by the illustrious *Bacon*.

V. 395. The *Art of Printing* appears to have been invented in *Europe* by LAURENCE KOSTER of *Harlaem* in 1440. An interesting disquisition on this subject is given by Sir James Burrow in his valuable report on the case of literary property.

V. 398. The *Microscope* was invented about 1621: and the *Telescope* about twenty years before,

V. 401. For the *new constellations* see ADAMS' *new globes*, with his treatise on the use of them, as also of the instances and application of the correspondence of the stars.

V. 684. See MARTIN's *Philosophia Britannica*, Lect. XII. note 10.

V. 724. Before this awful idea of everlasting felicity, which the presages of human nature in all times, and the conjectures of reason anticipated, but which is solidly established on the basis of revealed truth, all importance of the present *Universal System*, stupendous and immense beyond conception though it be, vanishes; and whether the now existing assemblage of *suns* and *planets* shall continue, or be extinct, and succeeded by a new universe, is matter rather of curiosity: however, the arguments for the permanency of the system, from the presumed incongruity of supposing the creation to be destroyed by its author, seem to have their weight; and those which result from the natural tendency to dissolution, by the accumulated effect of gravitating powers, may admit of a probable conjecture to diminish their force, on the hypothesis here advanced, of a central body which may regulate these anomalies by its superior influence; which is the idea of Mr. LACY in his *Universal System*.

B O O K V.

VERSE 341. The philosophy of colours seems to be expressed with singular beauty, perspicuity, and justness in the lines of *Lucretius*:

*Quoniam nequeunt sine luce colores
Esse, neque in lucem existunt; primordia rerum
Scire licet quam sint nullo velata colore.
Qualis enim cæcis poterit color esse tenebris;
Lumine qui mutatur in ipso; propterea quod
Recta aut obliqua percussus luce refulget?
Pluma columbarum quo pacto in sole videtur,
Quæ sita cervices circum collumque corruseat.
Namque alias fit uti claro sit rubra pyropo,
Interdum quodam sensu fit ut videatur
Inter cæruleum virides miscere smaragdos,

*Et quoniam plagæ quoddam genus excipit in se
Pypula, cum sentire colorem dicitur album,
Atque aliud porro nigrum cum et cætera sentet,

*Scire licet nil principis opus esse colores
Sed variis formis variantibus edere tactus.*

LUCR. L. II.

V. 407. See FERGUSON's *Traacts and Tables*, and the new edition of the *Cyclopædia*, title, COLOURS.

V. 423. See a voyage of a *French officer* to the isle of *Mauritius*, &c. and here let it be observed, that in reasoning upon *final causes* the only danger is, that the facts may be mistaken, or their consequences misapprehended: but there is nothing more certain, than that wherever good exists, it has its existence from the appointment of the *first cause*; and we cannot be deceived in ascribing it to infinite benevolence, combined with infinite power and wisdom. And
without

without the *Theory* of *final causes* the sublime and affecting philosophy of nature is robbed of its elevation and influence on the heart.

V. 421. Why strong and dark colours affect the sense with impressions that are intimately connected with the sublime, while the soft, equable, and insensibly varied are connected with the ideas of beauty, may be understood from the elegant and philosophic investigation in the essay on the *Sublime* and *Beautiful*; which proves that *sublimity* is connected with *pain* and *terror*, and the idea of beauty with pleasure, repose, security, and delicacy. This appears to answer with the characteristic differences assigned by the first of antient, or perhaps modern critics, in point of taste, and inferior to few at least, if to any, in acuteness and profundity, DIONYSIUS HALICARNASSENSIS, who, in his admirable treatise *Περί Συνδεδεστων*, conveys similar intimations on the principles of the *ἡδυ* and the *καλον*; only it may be proper to observe, that the *καλον* with him (notwithstanding the *equivoque* of the expression) is appropriated to the *sublime*, and the *ἡδυ* (though rather denoting a specific quality than the genus) signifies in his use of the word, the beautiful. Accordingly in his tenth chapter he adduces *Thucydides* for an example of the *καλον*, *Xenophon* of the *ἡδυ*, and *Herodotus* of both: and in the following chapter he attributes to the *καλον* grandeur, gravity, nobleness of sentiment, and dignity of expression; to the *ἡδυ* grace, elegance, fluency, and sweetness of style; which appears exactly conformable to the characters of the *sublime* and *beautiful* given by the accomplished writer of the essay.

V. 483. The proportional breadth of the primary or prismatic colours, in the order as they are seen in the rainbow, is as follows: and answers to the musical notes opposed to each colour.

Red,	45	}	=	{	Ut.
Orange,	27				Si.
Yellow,	48				La.
Green,	60				Sol.
Blue,	60				Fa.
Indigo,	40				Mi.
Violet,	80				Re.

If a top have its circular surface painted in these proportions, and the centre made black, it will, when spinning, appear white, from the rays being all blended with equal force as they proceed from the sun.

Colours next on each side from a given colour will produce that colour; orange and green a yellow; blue and violet an indigo; yellow and blue a green; red and yellow an orange.

V. 586. The law of bodies revolving round a common centre of gravity, is clearly explained in Mr. *Ferguson's* Mechanical Exercises.

The influence of the sun in raising the *Tides*, compared with that of the moon, is found to be about *one to five*. Hence we may judge how little can be the influence of the greatest planets on our sea, or even atmosphere.

V. 613. This was too notoriously exemplified in the efforts which it cost the Romans to establish themselves against the surrounding states of Italy, with the spirit of liberty and incorruptness which those efforts maintained, compared with that fatal rapidity and facility of conquest which spread instantaneously over the world then known, and subdued the victor to luxury and servitude.

V. 675. That the influence of the moon on the atmosphere, animal fluids, and the whole muscular and vascular system (and from the analogy of nature very probably on vegetation) is not a chimera, or a dull tenet of vulgar philosophy, may be rationally inferred, and appears to have been excellently proved and illustrated by Dr. MEAD in his truly philosophical treatise *De vi Solis et Luna*, where the principles and facts to which this and the following lines to 681 allude, with several others of *medical* and *physiological* importance, are elucidated.

B O O K VI.

VERSE 175. Upon this head Mr. *Lacy's* thoughts in his *Universal System* appear particularly worthy of attention.

The supposed periodical times of several remarkable comets are as follows, according to the computation of Mr. *Whiston* in his *Astronomical Principles of Religion* (a work perhaps not sufficiently known and valued) and HALLEY's Tables.

Period.	Mean Distances from the Sun.	When seen and expected.
yrs.		
1. 75	1. 458,000,000	1456. 1532. 1607. 1682. 1758. 1833
2. 129	2. 025,000,000	1532. 1661. 1790.
3. 575	6. 600,000,000	44. A. C. * * * 1106. 1680. 2255
Its greatest distance according to <i>Ferguson</i> , about - - }		11. 200,000,000.

It will be observed that two comets may be seen in the same year; of which the periods may be extremely different.

It will be considered also, that no two planets are found to coincide in the inclination of their orbit, or even in their place of *Perihelion*; in this latter Mercury and Saturn are the nearest to an agreement: the final cause is equally obvious and important to prevent too great an influence of their gravitating powers on each other; and in the comets perhaps even a collision. Now the

				0	1	"
Comet of 1607	had its orbit inclined			17.	2.	
That of 1682	— — —			17.	56.	
That of 1759	— — —			17.	40.	
The Perihelion of the 1st.	— — —			2.	16.	
Of the 2d.	— — —			2.	52.	45
Of the 3d.	— — —			3.	8.	10

And

And farther their ascending Node appears thus:

Ω	20°	21°	"
	21.	16.	30
	23.	45.	35

There is every reason therefore to presume, that these were in reality one comet; and if in 1833, or within a few months a comet concurring in these elements should appear, the probability will hardly amount to less than a moral demonstration.

The comet of 1680 in its *Perihelion* approached so near to the sun, as to be less than 49,000 miles distant from him; the same comet in descending towards its *Perihelion* was not a semidiameter of the earth to the Northward of the way of the earth. Its velocity at its *Perihelion* was such, that in two hours thirty-one minutes it travelled upwards of two millions two hundred thousand miles: or in seven minutes and an half one hundred and ten thousand miles: above fourteen thousand miles a minute, or more than 840,000 miles in an hour: being more than eight times the velocity of Mercury. The train of this comet was above eighty millions of miles in length.

The result of the observations of Mr. Betts, upon investigating the comet of 1744, was, that its axis came out infinite: consequently its return, if any, cannot be expected till a very remote period. Perhaps it may have gone off in a *parabola*, if not even in an *hyperbola*.

The last great comet in the year 1770 was observed both in its *Perihelion* and *Aphelion*; and from the phenomena of its train, nucleus, and apparent velocity, is probably of great magnitude, and exceedingly eccentric. Its elements are investigated in the American Philosophical Transactions.

V. 210. This subject is fully and beautifully discussed by Dr. Price.

V. 424. This is the idea of the very ingenious Mr. HENLEY.

V. 431. For the mode of producing the several kinds of air, the method of distinguishing them, and the nature and cause

cause of their effects, see Dr. PRIESTLY, and the last edition of the *Cyclopædia*, title, AIR.

V. 581. Dr. WILLIAM GILBERT, physician, published in his celebrated treatise *De Magnete*, in 1600, various discoveries in electricity; particularly of the classes of electric substances, principally in the vitreous, but not without observing several resinous substances endued with this quality.

V. 582. The learned and amiable ROBERT BOYLE, who died in 1691, with his usual industry and unlimited desire of knowledge, made investigation of the subject; and at the same time the celebrated OTTO GUERICKE, burgomaster of Magdebourg, pursued his researches with somewhat greater success, each to all appearance unassisted by the labours of the other.

Mr. HAWKSBEЕ's experiments were published in 1709.

Mr. STEPHEN GREY made a very considerable progress between 1759 and 1785.

Dr. DESAGULIERS published his discoveries between 1739 and 1742.

About 1742 Mr. du BOZE, professor of philosophy at Wittenburg, introduced his invention.

Mr. P. GORDON, a Scotch benedictine, professor of philosophy at Erford, introduced the cylinder about the same time.

The great advances for which the science stands indebted to Dr. WATSON were made in 1745 and 1746.

At the same period the LEYDEN phial was discovered by Mr. Von KLEIST and CUNEUS; the one at *Dantzick*, the other at *Leyden*: and Dr. Watson's experiments upon this and other branches of electrical knowledge were continued with distinguished assiduity, judgment, and success in the year 1747.

Dr. FRANKLIN's great discovery of conducting the electrical matter from the clouds was made in June 1752.

The account of Signor BECCARIA's interesting experiments and theory makes a very important part of Dr. Priestly's truly valuable *History of Electricity*, from which I have extracted the several facts and dates mentioned in the poem and in these notes.

For

For the theory of *positive* and *negative* electricity, see Part II. sec. 2. The result of this theory is confirmed by experiment: for a jar when insulated cannot be charged, the external side having no communication with non-electric substances, which might carry off the electricity, the inside will receive none from the conductor. See this point clearly stated and ascertained in Mr. CAVALLO's *Treatise on Electricity*, Chap. VII. Exper. 1. 2. 3.

The Theory of the *Aurora Borealis* here represented is very strongly supported by Dr. FRANKLIN, in a paper to be found in the miscellaneous tracts lately published of that exalted character, who has united the talents of NEWTON with those of SOLON. The notes of the learned editor on this part of so interesting and extensive a collection will probably be thought by the reflecting reader very particularly valuable; and indeed it seems difficult to give adequate praise to the judgment and integrity of a comment, which appears throughout so worthy of the text.

The preference of *pointed* conductors to blunt is evident from the circumstance of their receiving the positive, and discharging the negative electricity, insensibly and at a distance; while knobbed conductors would have no effect on a distant cloud; and would cause an explosion, which might be attended with great mischief when the cloud should be near. Whoever will present a point to a jar, and then charging it again will try a knob, may decide the controversy, if it can still be called one. The supposed advantage of the round or blunted conductor in not inviting the electric discharge, is a real objection of the first magnitude; since the object of a conductor is that which those with points answer, to restore the equilibrium without shock, where the cloud is positively electrified, before it comes within striking distance, and to relieve the earth of its overcharge, where the cloud is negative, without a fatal explosion into the atmosphere: whereas a round or blunted conductor suffers a cloud to come near the striking distance, before the balance of electricity is affected by it in either case: and when it does act, it resists the entrance of the electricity from the clouds, or the escape of it from the earth, and therefore is inadequate to prevent, and may in many cases be accessory in producing the

the evil against which it was intended to guard : while the pointed, at the worst, will never increase the danger, in almost every case will greatly diminish and in general totally prevent it.

This head may be concluded with some of the most interesting queries on electricity, extracted from the history.

May not the sun be the fountain of the electric fluid; and the zodiacal light, the tails of comets, the Aurora Borealis, lightning, and artificial electricity, its various and not very dissimilar modifications?

What similarity is there in the process of calcination, vegetation, animalization, and chrySTALLIZATION; since all those bodies which have gone through any of those processes, and perhaps no others, are found electric?

Does not the electric matter pass chiefly over the surface of bodies?

Is the fluid on which electricity depends concerned in the functions of the animal body?

As thunder generally happens in a sultry state of the air, when it seems replenished with some sulphureous vapours, may not the electric matter then in the clouds be generated by the fermentation of sulphureous, with mineral or acid vapours in the air?

Is not the earth in a constant state of moderate electrification; and is not this the cause of vegetation, exhalation, and other the most important processes in nature?

Supposing earthquakes to be caused by the discharge of a redundant electricity from the surface of the earth, might they not be prevented in countries subject to them by kites constantly flying very high with wires in the strings, so as to promote an easy communication between the earth and the upper regions of the atmosphere?

V. 569. How properly the poetical diction assigns this character to the Greek language may appear from the following admirable passage in the HERMES.

" Now the *Language* of the GREEKS was truly like themselves; it was conformable to their transcendent and universal genius. Where matter so abounded, words followed of course, and those exquisite in every kind, as the

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ideas

ideas for which they stood. And hence it followed, there was not a subject to be found, which could not with propriety be expressed in *Greek*.

“ Here were words and numbers for the humour of an *Aristophanes*; for the native elegance of a *Philemon* or *Menander*; for the amorous strains of *Minnermus* or *Sappho*; for the rural lays of a *Theocritus* or *Bion*; and for the sublime conceptions of a *Sophocles* or *Homer*. The same in prose. Here *Isocrates* was enabled to display his art in all the accuracy of periods, and the nice counterpoise of diction. Here *Demosthenes* found materials for that nervous composition, that manly force of unaffected eloquence, which rushed like a torrent too impetuous to be withstood.

“ Who were more different in exhibiting their *philosophy* than *Xenophon*, *Plato*, and his disciple *Aristotle*? Different in their character of *composition*: for as to their philosophy itself it was in reality *the same*. *Aristotle* strict, methodic, and orderly; subtle in thought, sparing in ornament; with little address to the passions or imagination; but exhibiting the whole with such a pregnant brevity, that in every sentence we seem to read a page. How exquisitely is all this performed in *Greek*! Let those, who imagine it may be done as well in any other language, satisfy themselves either by attempting to translate him, or perusing his translations already made by men of learning. On the contrary, when we read either *Xenophon* or *Plato*, nothing of this *method* and strict *order* appears: the *formal* and *didactic* is wholly dropt. Whatever they may teach it is without professing to be teachers: a train of dialogue and truly polite address, in which, as in a mirror, we behold human life adorned in all its colours of sentiment and manners.

“ And yet, though these differ in this manner from the *Stagirite*, how different are they likewise in character from each other! *Plato* copious, figurative, and majestic; intermixing at times the facetious and satiric; enriching his works with tales and fables, and the mystic theology of ancient times. *Xenophon*, the pattern of perfect simplicity; every where smooth, harmonious, and pure; declining the figurative, the marvellous, and the mystic; ascending but rarely into the sublime; nor then so much trusting to the colours of style, as to the intrinsic dignity of the sentiment itself,

"The language in the mean time in which He and Plato wrote, appears to suit so accurately with the style of both, that when we read either of the two, we cannot help thinking, that it is he alone who has hit its character, and that it could not have appeared so elegant in any other manner.

"And thus is the GREEK TONGUE, from its propriety and universality, made for all that is great, and all that is beautiful, in every subject, and under every form of writing." HERMES, Chap. V.

BOOK VII.

VERSE 7. See WHISTON's *Astronomical Principles of Religion* and CUDWORTH's *Intellectual System*.

V. 136. See the observations of NIEUNTWYT, RAY, DERHAM, BOYLE; and the various articles in the last greatly improved edition of the *Cyclopaedia* relative to human ANATOMY.

V. 336. This refers to Mr. BOUFFON, whose hypothesis in the part of it here mentioned, seems to be nearly connected with that of the famous teacher of *Pericles*, like whom he unites eloquence with natural, moral, and political philosophy.

V. 307. KEIL in his *Institutiones Physicae* computes after LIEUENHOEK, that the red globules in the blood do not exceed the eight thousand quintillionth part of a cubic inch; or that ten thousand mountains as large as *Teneriffe* would not contain an equal number of sands, as a grain of sand would of these globules.

V. 509. The HUMANE SOCIETY for restoring *Animation* to drowned persons cannot be sufficiently applauded. This institution owes its establishment to Dr. COGAN and Dr. HAWES.

V. 538. There is an admirable passage of our great master in the art of reasoning, to this effect. It is as follows:

“Finding in all the parts of the creation that fall under human observation, that there is a gradual connection of one with another, without any great or discernible gaps between, we have reason to be persuaded that by such gentle steps things ascend upwards in degrees of perfection. It is a hard matter to say where sensible and rational begin, and where insensible and irrational end: and who is there quick-sighted enough to determine precisely which is the lowest species of living things, and which the first of those which have no life? Things, as far as we can observe, lessen and augment, as the quantity does in a regular cone; where, tho’ there be manifest odds betwixt the bigness of the diameter at a remote distance, yet the difference between the upper and under, where they touch one another, is hardly discernible. The difference is extremely great between some men and some animals; but if we will compare the understanding of some men and some brutes, we shall find so little difference, that it will be hard to say that of the man is either clearer or larger. Observing, I say, such gradual and gentle descents downwards in those parts of the creation that are beneath men, the rule of analogy may make it probable, that it is so in things above us and our observation; and that there are several ranks of intelligent beings, excelling us in several degrees, ascending upwards towards the infinite perfection of the Creator by gentle steps and differences, that are every one at no great distance from the next. This sort of probability, which is the best conduct of rational experiments and the rise of hypothesis, has also its use and influence: and a wary reasoning from analogy leads us often into the discovery of truth and useful productions of nature, which would otherwise lie concealed.” B. IV. Chap. vi. Sec. 13. of the *Essay on Human Understanding*. There is another passage of a similar tendency quoted by the *Spectator* from the same admirable author.

Perhaps those who have taste and reflection, will easily excuse my dignifying these notes with extracts from two authors of the most distinguished merit, expatiating the vast universe

universe with sentiments worthy of the boundless sublimity of the object.

The first is the excellent M'LAURIN, who with his dying hand traced the ideas which I now lay before the reader.

“ We cannot but take notice of one thing that appears to have been designed by the Author of nature. He has made it impossible for us to have any communication from this earth with the other great bodies of the universe in our present state; and it is highly probable that he has likewise cut off all communication betwixt the other planets and betwixt the different systems. From hence, as well as from the state of the moral world, we are induced to believe that our present state would be very imperfect without a subsequent: wherein our views of nature and of its great Author may be more clear and satisfactory. This, therefore, naturally leads us to consider our present state as only the dawn or beginning of our existence, and as a state of preparation or probation for farther advancement: which appears to have been the opinion of the most judicious philosophers of old. And whoever attentively considers the constitution of human nature, particularly the desires and passions of men, which appear greatly superior to their present objects, will easily be persuaded that man was designed for higher views than of this life: these the Author of nature may have in reserve to be opened to us at proper times, and after due preparation. Surely it is in his power to grant us a far greater improvement of the faculties we already possess, or even to endow us with new faculties, of which at this time we have no idea, for penetrating farther into the scheme of nature, and approaching nearer to himself, the first and supreme Cause. We know not how far it was proper or necessary that we should not be let into knowledge at once, but should advance gradually, that by comparing new objects, or new discoveries, with what was known to us before, our improvement might be more complete and regular; or how far it may be necessary or advantageous that intelligent beings should pass through a kind of infancy of knowledge: for new knowledge does not consist so much in our having access to a new object, as in
com-

comparing it with others already known, observing its relations to them, discerning what it has in common with them, and wherein their disparity consists. Thus our knowledge is vastly greater than the sum of what all its objects separately could afford; and when a new object comes within our reach, the addition to our knowledge is the greater, the more we already know: so that it increases not as the new objects increase, but in a much higher proportion."

The other author is Dr AKENSIDE, who joined the dignity of the *Stoic* and beauty of the *Platonic* philosophy, with the harmony, the energy, the vivid and enchanting colours of *Lucretius*.

—————*The high-born Soul*

*Disdains to rest her heaven-aspiring wing
Beneath its native quarry. Tir'd of earth,
And this diurnal scene, she springs aloft
Through fields of air; pursues the flying storm;
Rides on the volley'd lightning through the heavens;
Or, yok'd with whirlwinds and the Northern blast,
Sweeps the long tract of day. Then high she soars
The blue profound, and, hov'ring o'er the Sun,
Beholds him pouring the redundant stream
Of light; beholds his unrelenting sway
Bend the reluctant planets, and absolve
The fated rounds of time. Thence, far effus'd,
She darts her swiftneſs up the long career
Of devious comets; through its burning signs,
Exulting, circles the perennial wheel
Of Nature, and looks back on all the stars,
Whose blended light, as with a milky zone,
Invests the orient. Now amaz'd she views
The empyreal waste, where happy spirits hold,
Beyond this concave heaven, their calm abode;
And fields of radiance, whose unfading light
Has travell'd the profound six thousand years,
Nor yet arrives in sight of mortal things;
Even on the barriers of the world, untir'd
She meditates the eternal depth below;
Till, half recoiling, down the headlong steep
She plunges; soon o'erwhelm'd, and swallow'd up*

In that immense of being. There her hopes
 Rest at the fated goal. For from the birth
 Of mortal man, the Sovran Maker said,
 That not in humble nor in brief delight,
 Not in the fading echoes of renown,
 Power's purple robes, nor Pleasure's flowery lap,
 The soul should find enjoyment: but from these
 Turning disdainful to an equal good,
 Through all the ascent of things enlarge her view,
 Till every bound at length should disappear,
 And infinite perfection close the scene.

Pleasures of Imagination, B. I.

There remains only to say, that great part of the first book and some other passages are translated from *Buchanan*. Some use has been made of the *Antilucetius* of *Polignac*. My first idea was to have accommodated the unfinished work of the former author to the *Newtonian* system; and conformably to this view considerable additions and alterations were made in that elegant and truly classical poem. From hence the idea was derived to compose something in English that might convey a notion of the true system, in such a manner as possibly would interest and entertain. If it should give occasion to a genuine didactic poem from some hand qualified for such a subject, the author would be abundantly consoled for his own deficiencies. He at least is happy that at the same time when he may be ashamed of the faults and imperfections of the work, he can sincerely pride himself in the merit of the person to whom it is addressed, and rely, that the only dedication he ever made, or designs to make, will need no other apology, than the want of adequate value in the performance to which it is prefixed.

1st March 1781.

T H E E N D,



C O R R I G E N D A.

B O O K II.

V. 320. *read* " the just increase of but six tenths beyond."

B O O K III.

V. 513. *read* PYM, HAMPDEN, LUDLOW, VANE, and
SYDNEY beam'd.

B O O K VI.

V. 591. *read* WALL, for sublimer scenes were soon to rise.

V. 705. *for* external, *read* internal.

V. 707. *read* Positive: but without compell'd to part.